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MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

May 3, 1991

TO: Ronda Hall
H.W. Permits Unit, WMD

FROM: David Slayton
Geotechnical Unit, WMD David Slayton

SUBJECT: Quanex Corporation
MID 082 767 591
PR/VSI Report (dated Feb. 1991)

I have reviewed the PR/VSI Report prepared by Metcalf & Eddy on behalf of EPA. The report is dated February 1991. I have the following comments on the report.

1. The report states in Section 2.3.1 on page 13 that "Releases of low levels of arsenic and 1,1 dichloroethane should continue". First, the source of the arsenic has not been proven, and may in fact represent background groundwater quality. The company has been requested in the 1991 CME report to submit a plan to confirm whether or not arsenic is naturally occurring in the groundwater. Second, the sentence would read better if it stated that "releases of low levels of arsenic and 1,1, dichloroethane may continue until sources are identified and remediated".

2. The PR/VSI report should identify the area around the WWTP and monitor well MW-6 as an area of concern due to the presence of 1,1 dichloroethane. The levels found in MW-6 are relatively higher than other wells, indicating another possible release, separate from the surface impoundments.

3. Releases of metals and organics from the surface impoundment area could also be from the buried landfill found at the southern end of the impoundments. The debris in the berms may be the source of any contaminants.

4. On page 26, paragraph D, it states groundwater monitoring has been performed, implying that it covered the former acid pits. No groundwater monitoring was designed to cover these old acid pits, and monitor wells were not shown to be downgradient of these units. Any statement regarding monitoring should be backed up by specific references to data.

cc: De Montgomery

REPORT

U.S. ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES X

CONTRACT NO. 68-W9-007
WORK ASSIGNMENT NO.R05043

PRELIMINARY REVIEW/VISUAL SITE INSPECTION (PR/VSI) REPORT FOR RCRA FACILITY ASSESSMENT (RFA) AT QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION SOUTH LYON, MICHIGAN

U.S. EPA REGION V

METCALF & EDDY, INC.
PROJECT NO. 150043-0031-626

WORK PERFORMED BY:

METCALF & EDDY OF MICHIGAN, INC.
1101 WASHINGTON BLVD., SUITE 400
DETROIT, MICHIGAN 48226

SEPTEMBER, 1990

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PRELIMINARY REVIEW/VISUAL SITE INSPECTION (PR/VSI) REPORT
RCRA FACILITY ASSESSMENT (RFA)

FACILITY NAME: **QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION**
SOUTH LYON, MICHIGAN

Visual evidence

EPA ID #: **MID 082 767 591**

1.0 INTRODUCTION

This report was prepared by Metcalf & Eddy, Inc. under the Technical Enforcement Support (TES) X contract at the request of the United States Environmental Protection Agency (U.S.EPA) Region V. It describes the Preliminary Review (PR) of file material for the Quanex Corporation-Michigan Seamless Tube (MST) facility and the Visual Site Inspection (VSI) of the facility. These are the first two steps in conducting a Resource Conservation & Recovery Act (RCRA) Facility Assessment (RFA). The format of this document is in accordance with U.S. EPA guidance on conducting and documenting an RFA. The purpose of this report is to summarize available information about the site and to assist the U.S. EPA in recommending further steps in the corrective action process.

Enforcement History

The Michigan Department of Natural Resources (MDNR) has conducted regulatory enforcement activities at this site. On August 5, 1983 a Consent Agreement and Final Order (CAFO) was issued to Quanex Corp-MST regarding cessation of hazardous waste (HW) treatment, storage or disposal except per 40 CFR Part 265 and regarding compliance with Consolidated Permit Regulations in accordance with 40 CFR Parts 124 and 270 (95). Following submittal of a Part A Permit Application in 1980 (95) as allowed by this CAFO, Quanex Corp - MST pursued an extension in submitting a Part B application due to the delisting of lime stabilized waste pickle liquor sludge from the hazardous waste list as of December 5, 1984 (85). Then on February 4, 1985 another CAFO was issued regarding compliance with 40 CFR Part 265 and violations of 42 USC Sections 6924 and 6925 (76).

An NPDES Permit (MI0001902) was issued to Quanex Corp-MST on September 5, 1985 (69,72). Violations of permit regulations regarding phosphates and total solids have been reported on several occasions (6,13). What kind?

On October 28, 1986 MDNR directed Quanex Corp-MST to perform a remedial investigation (RI) of their sludge drying beds for possible soil and groundwater contaminants (52). The resulting investigation and monitoring by Quanex Corp - MST showed that the sludge was not inert, as assumed, and was subject to the requirements of Public Act 641 (44).

was this a consent order, a judicial order, or what? — does it need remediation

On September 24, 1987, MDNR approved the August 5, 1987 revised closure plan for surface impoundments and container storage areas (39). During November, 1988, Quanex Corp - MST expanded their wastewater treatment facility and discontinued discharge of sludge to the surface impoundments (18,28).

see note on back of table of Contents

Quanex ~~Corp - MST~~ requested an extension of closure for the surface impoundments on November 2, 1988 and submitted a petition for Type III designation of the surface impoundment sludge in July, 1989 (8,18). Note that in Michigan, Type III wastes are wastes which have very low potential for ground water release whereas Type I wastes are characteristically hazardous and the definition of Type II wastes lies somewhere inbetween, as defined in Acts 64 and 641. An amended closure plan for the surface impoundments was submitted on August 27, 1989 (4). MDNR issued a Notice of Deficiency on November 15, 1989 regarding certification of the HW Container Storage Unit Closure and in February, 1990, MDNR accepted a revised closure certification and released Quanex Corp - MST from financial responsibilities regarding the closed unit (1, 117).

Metcalf and Eddy (M&E) performed a file review of the Quanex ~~Corp~~ - MST files at the Michigan Department of Natural Resources (MDNR) office located in Lansing, Michigan, and the U.S. EPA Region V RCRA files located in Chicago, Illinois. Fifteen Solid Waste Management Units (SWMUs) and Areas of Concern were tentatively identified based on the file information. M&E performed the VSI on September 5, 1990 to verify the file information and initial conclusions regarding the SWMUs and Areas of Concern, and identify other SWMUs or Areas of Concern, if present. The M&E site inspectors,

identify

representing Quanex Corp - MST: Mr. Charles Simpson, Quanex Corp. Chief Engineer, Mr. Donald Comfort, Quanex Corp. Engineering Manager; Mr. William Merchant, Quanex Corp. Plant Engineer; Mr. Dennis Hatfield, Principal of Patterson Schafer Inc., environmental consultants; and Mr. Roger Patrick, Quanex Corp. Counsel from Sonnenschein Nath & Rosenthal. Based on the VSI, the number of SWMUs and Areas of Concern was changed from twelve and three, respectively, to four and three because many of the initially identified areas were found to be active process material areas or were non- hazardous material areas. Examples of these would be sulfuric acid process tanks and a retired-equipment temporary storage/dismantling and scrap metal area. No new SWMUs or Areas of Concern were identified during the VSI.

This report summarizes file information related to releases of hazardous wastes at the Quanex Corp - MST facility. Releases into all media are considered, including air, surface water, ground water, soils, and subsurface gases. All areas of potential release are considered, but the focus is on Solid Waste Management Units (SWMUs). SWMUs are defined as any discernible waste management unit at a RCRA facility from which hazardous constituents might migrate.

Section 2.0 of this report provides an overall facility description. Facility operations, environmental characteristics, and potential releases are described from a facility-wide perspective. Detailed discussion of each SWMU are provided in Section 3.0. Section 4.0 summarizes the information given in Sections 2.0 and 3.0 and provides recommendations regarding a sampling visit, interim measures, an RFI or no further action at the facility. A bibliography of documents reviewed in preparing this report is given in Section 5.0. All the documents in Section 5.0 were reviewed in preparing this report, but not all contained information that needed to be cited as references in this report.

2.0 GENERAL DESCRIPTION OF FACILITY AND PROCESSES

Quanex Corp - MST manufactures seamless steel tubing from round steel bars. Operations include tubing immersion in sulfuric acid pickling baths, hot and cold water rinsing, application of cold-drawing lubricant, and possible immersion in a cleaner/rust inhibitor. A lime slurry is metered into the

merge with 2.1

acidic waste stream to neutralize it. The liquid portion of the waste stream is then discharged under NPDES permit into Yerkes Drain. Solids settled out in the treatment process are dewatered, collected and transported offsite to a licensed Type II landfill. The treatment process formerly included two surface impoundments and two sludge drying beds which are currently undergoing waste-type designation processes and/or cleanup and closure under MDNR enforcement.

? Process diagram of SWMUs

2.1 Facility Location and Operation

The Quanex Corp - MST Division is located on the southwest side of the City of South Lyon in Oakland County, Michigan. See Figures 1 and 2 for the county and facility locations, respectively. The site is bordered by Ten Mile Road on the north, McMunn Street on the east, the Grand Trunk Western Railroad right-of-way on the south and Dixboro Road on the west. The facility covers approximately 53 acres (75). Figure 3 shows a plan of the facility.

The facility manufactures seamless steel tubing by using hot and cold mill processes. During this process, round steel bars are heated, pierced and air cooled. After cooling, lubricants consisting of zinc phosphate and sodium stearate elements are applied prior to cold-drawing of the tubing to the required dimensions. If further size reduction becomes necessary, annealing, acid pickle liquor cleaning, rinsing, and drying are performed (8). The processing operation produces approximately one million gallons of wastewater per day (59,75).

Hazardous and non-hazardous wastes generated by the processes include waste pickle liquor, acid cleaning rinsewater, machine lubricating oils, salt pot waste, steel and metal scrap and commercial product residues in liners and containers (75).

? SWMUs

Wastewater treatment at the plant includes a lime slurry for flocculation and neutralization, aeration, and the settling and filter pressing of solid components (3,54). The treated wastewater is discharged through a NPDES permitted outfall to Inchwagh Lake via Yerkes Drain. Prior to November, 1988, wastewater was discharged into two surface impoundments before

How are solvents collected?

METCALF & EDDY

FIGURE 1: Oakland County, Michigan

SCALE: NONE

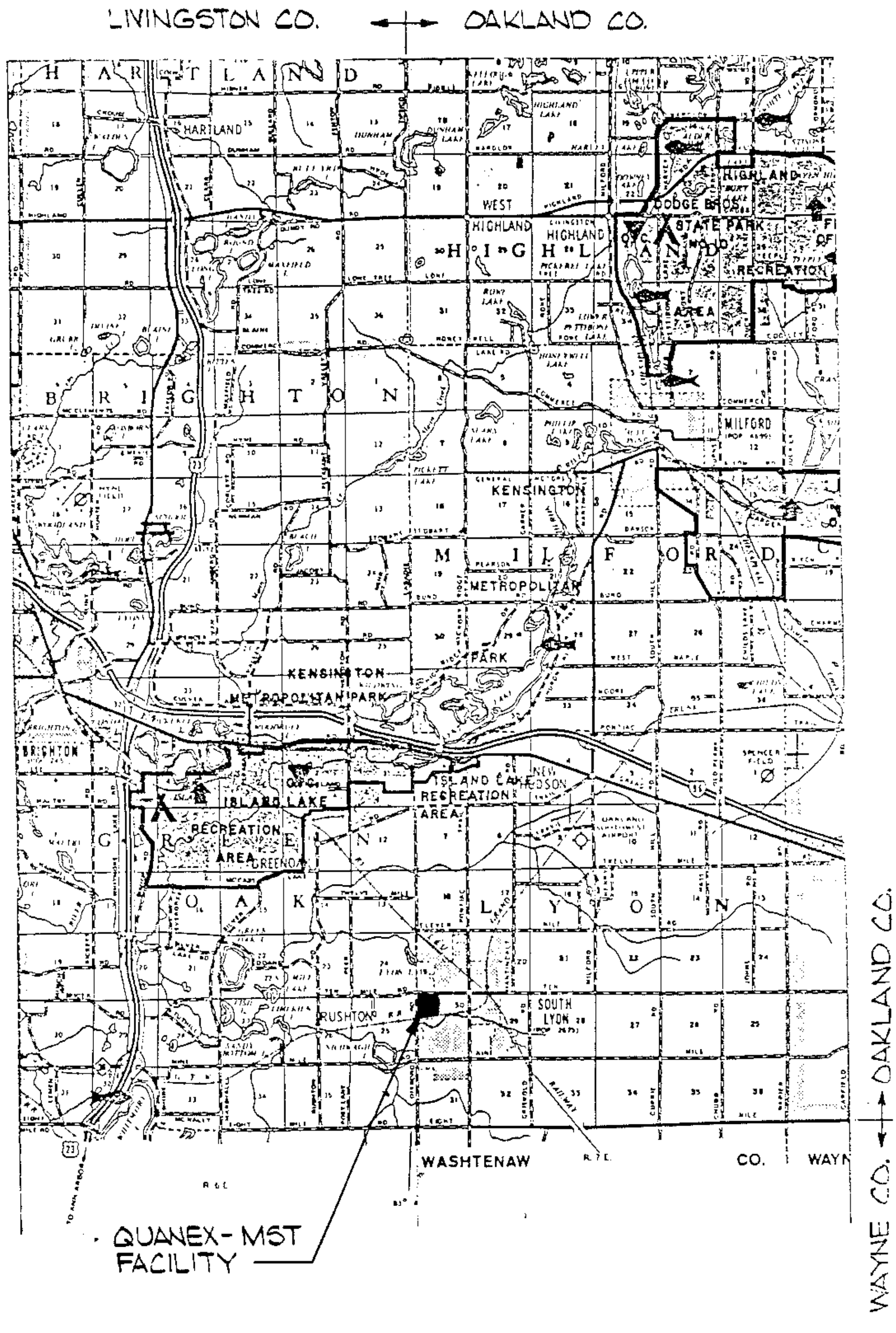

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FIGURE 2: Location of Quanex-MST Facility in Oakland County

SCALE: NONE

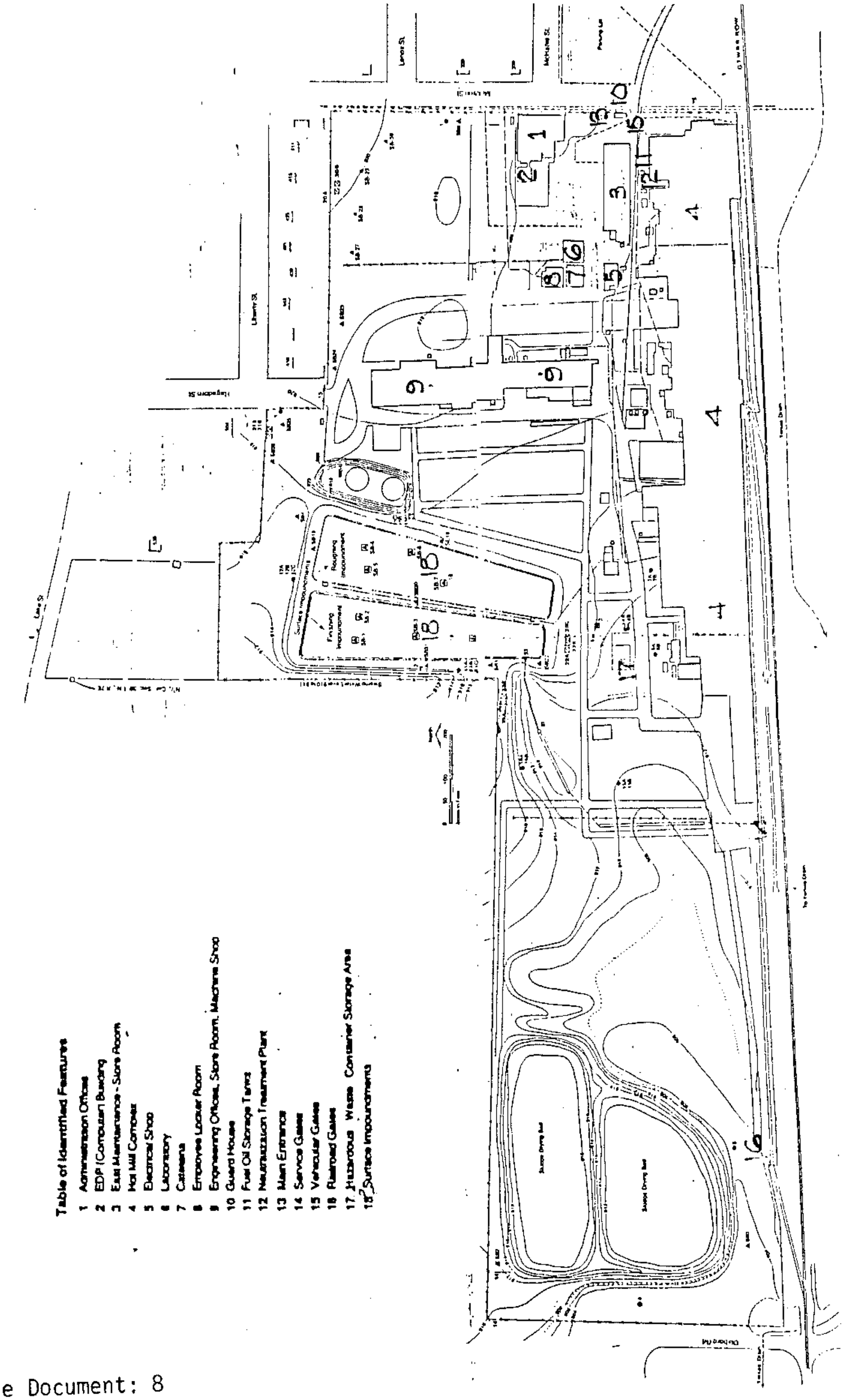

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FIGURE 3: Quanex MST Facility
Site Plan

SCALE: NONE

Summa

release into Yerkes Drain (75). Settled solids from the impoundments were placed in two sludge drying beds from 1970 to 1987 (33). Sludge produced after the 1988 expansion of the wastewater treatment plant has been disposed of offsite in a licensed Type II landfill.

2.2 Environmental Setting

Quanex Corp - MST is located immediately to the north of the Yerkes Drain. Some swampy areas are present along the north and western edges of the site. Inchwagh Lake and its surrounding wetlands are located one-half mile southwest of the site as shown in Figure 2. Residential properties are located to the northeast, east and southeast (75). Two municipal wells are located ¼ mile east-southeast of the facility (60).

highlight the map

2.2.1 Geology

In the South Lyon region, 300 to 400 feet of glacial drift overlies the Mississippian Coldwater Shale. Quanex Corp - MST is in an interlobate area, northwest of the Erie glacial lobe. In the north-northeast part of the site, 15-30 feet of outwash sand and gravel deposits rest on interbedded silt, sand and clay. In the southeast part of the site, only outwash deposits are found and are approximately 70 feet deep (22). The glacial drift is dominantly outwash, moraine deposits and other ice contact deposits including interbedded clays, sandy clays, or sand and gravel. The land surface generally slopes to the southwest from an elevation of 1000 feet approximately two miles northeast of the facility to elevation 887 feet, which is the surface of Inchwagh Lake. The estimated elevation of bedrock is 650 feet (60). Surface grade of the Quanex Corp -MST facility ranges approximately from elevation 910 feet to 920 feet (66).

2.2.2 Hydrogeology

prior to closure?

Groundwater monitoring and well logs have indicated vertical and horizontal gradients through the outwash aquifer underlying the site. Groundwater elevations taken in the past have shown mounding of the water table under the two surface impoundments (22, 60). However, the present existence of such a mound is uncertain since the surface impoundments have not contained need map of site, drain, + lake

discharge waters since November, 1988 (18). The dissipation in elevation of the mound toward Yerkes Drain to the southeast was greater than the dissipation in elevation of the mound to the northwest because the outwash underlying the site to the north rests upon interbedded silts, clays and sands relatively close to grade. A ~~groundwater~~ hydraulic conductivity permeability at this site of approximately 0.0094 cm/sec has been found using monitoring wells (22). Groundwater flow velocity through the outwash aquifer away from this mound has been estimated at 0.22 ft/day; and was once estimated at 4.5 ft/day immediately adjacent to the mound due to the vertical gradient caused by the previous head of water in the impoundments (22). ~~Whether a groundwater mound is present or not, some groundwater may discharge to the swampy area to the northwest of the site but most of the groundwater will discharge into Yerkes Drain to the southeast.~~ says who? why?

the company reports

by whom? when?

attach hydrogeo report

2.2.3 Climate/Meteorology

convert to m/s

Climate information available from the U.S. Department of Agriculture Soil Conservation Service indicates that an average annual windspeed of 10.0 knots from the prevailing southwesterly direction occurs in this general region. The average annual temperature is approximately 59° F and average yearly total precipitation is approximately 30 inches.

2.3 Pollutant Releases into Ground Water

wetlands!? – no mention in 2.2 locate wetlands on map

On March 9, 1974, a Michigan Water Resources Commission investigation revealed an accumulation of oil in the Yerkes Drain and in the wetlands in the southwest corner of the Quanex Corp - MST facility. It was then determined that an old fuel line had ruptured, releasing an unknown volume of fuel oil to the surface of the groundwater table and into Yerkes Drain (36, 79). The release volume has been estimated to be anywhere from 200,000-300,000 gallons, at 420,000 gallons, and from 400,000 to 500,000 gallons (36,57,75). Figure 4 shows the area of effect of the release. On December 14, 1988, debris was uncovered during sludge solidification activities in the surface impoundments (9,16). Testing revealed the presence of no contaminants in the ground water but did find scattered

method?

only 1 sample

Citation 75 has inaccurate info.

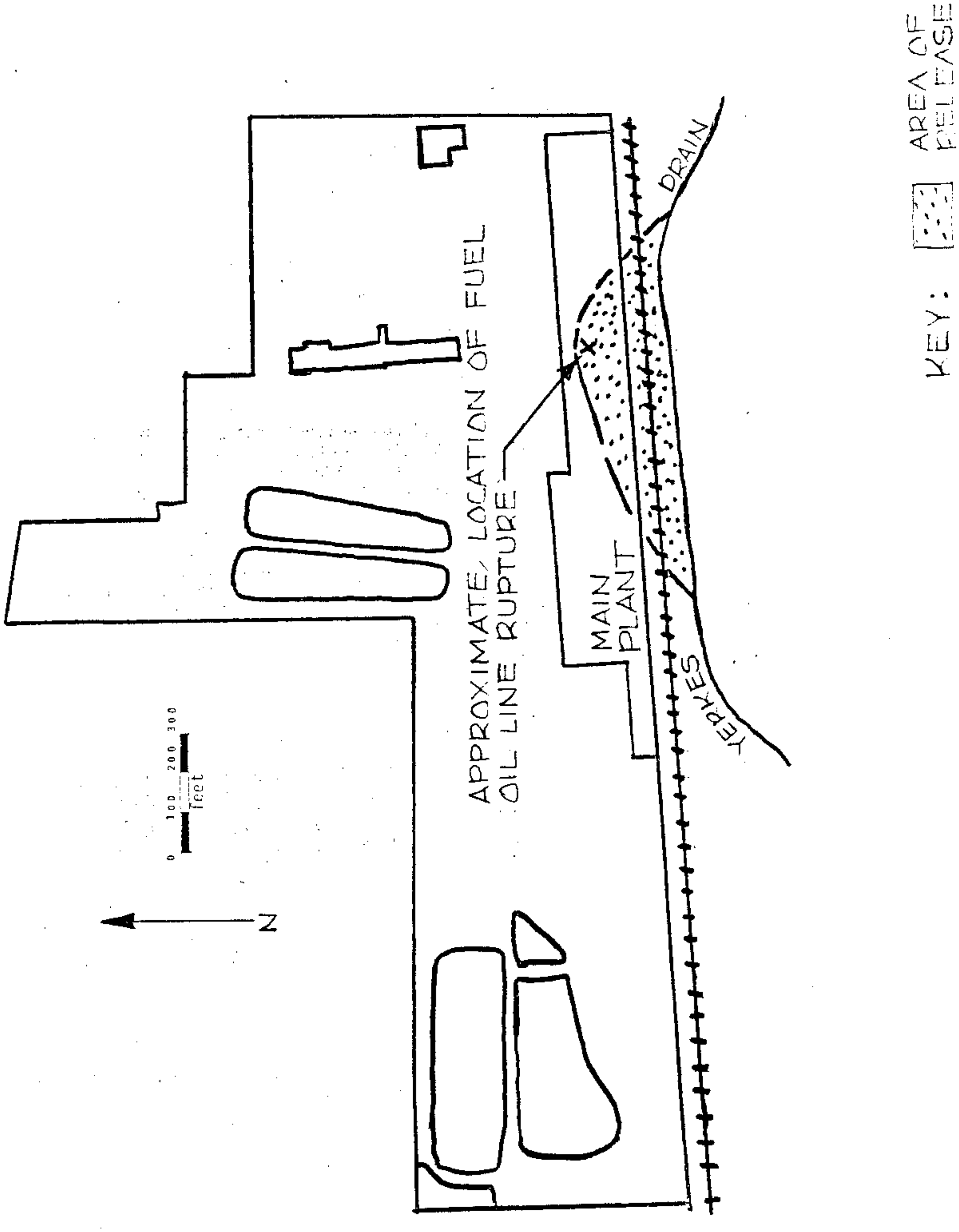

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FIGURE 4: Quanex MST Fuel Oil Area Plan

SCALE: NONE

range

levels of lead, chromium, toluene and 1,1,1 trichloroethane in berm soil and dried sludge samples (See Appendix A). Releases from the sludge drying beds, surface impoundments and former acid pits have not been indicated by monitoring well information.

2.3.1 Release Potential

The fuel oil line has been disconnected from the present oil storage system so no further releases from this source should occur (79). Cleanup and disposal activities for the debris located in the berm between the surface impoundments are awaiting MDNR approval of either a work plan or an amended closure plan. Testing has indicated no evidence of groundwater releases from the berm debris, drying beds, surface impoundments or acid pits, so release potential is probably low. Where is data?

2.3.2 Monitoring Data

How is fuel oil being recovered? continuously?

The groundwater monitoring system for the fuel oil release consists of monitoring wells and release control and fuel oil collection equipment. Bi-annual reporting of fuel oil recovery since the release occurred has been performed and, as of December 30, 1987, approximately 290,000 gallons of fuel oil had been recovered. At that reporting, 10 gallons had been recovered over the preceding six months (35,79). Well points and soil and sludge samples were used to monitor the debris contaminant location in the surface impoundment berm and no contamination was found in the groundwater sample (16). Groundwater monitoring at the site for interim status and in accordance with the Groundwater Quality Assessment Program have reported the presence of arsenic (3.7 - 9.2 ppb), copper (10-30 ppb), selenium (2.9 ppb), 1,1-dichloroethane (1.2 -5.3 ppb), iron and sulfate (32,47,60). Arsenic, iron and sulfate are attributed to natural or offsite sources and 1,1-dichloroethane to well contamination (32, 46). See Figure 5 for site monitoring well locations. (by the co?) Does MDNR concur? attach data in appendix

2.3.3 Potential Receptors

Yerkes Drain and Inchwagh Lake are potential receptors. Two municipal wells are located 1/4 mile east-southeast of the facility, on the opposite

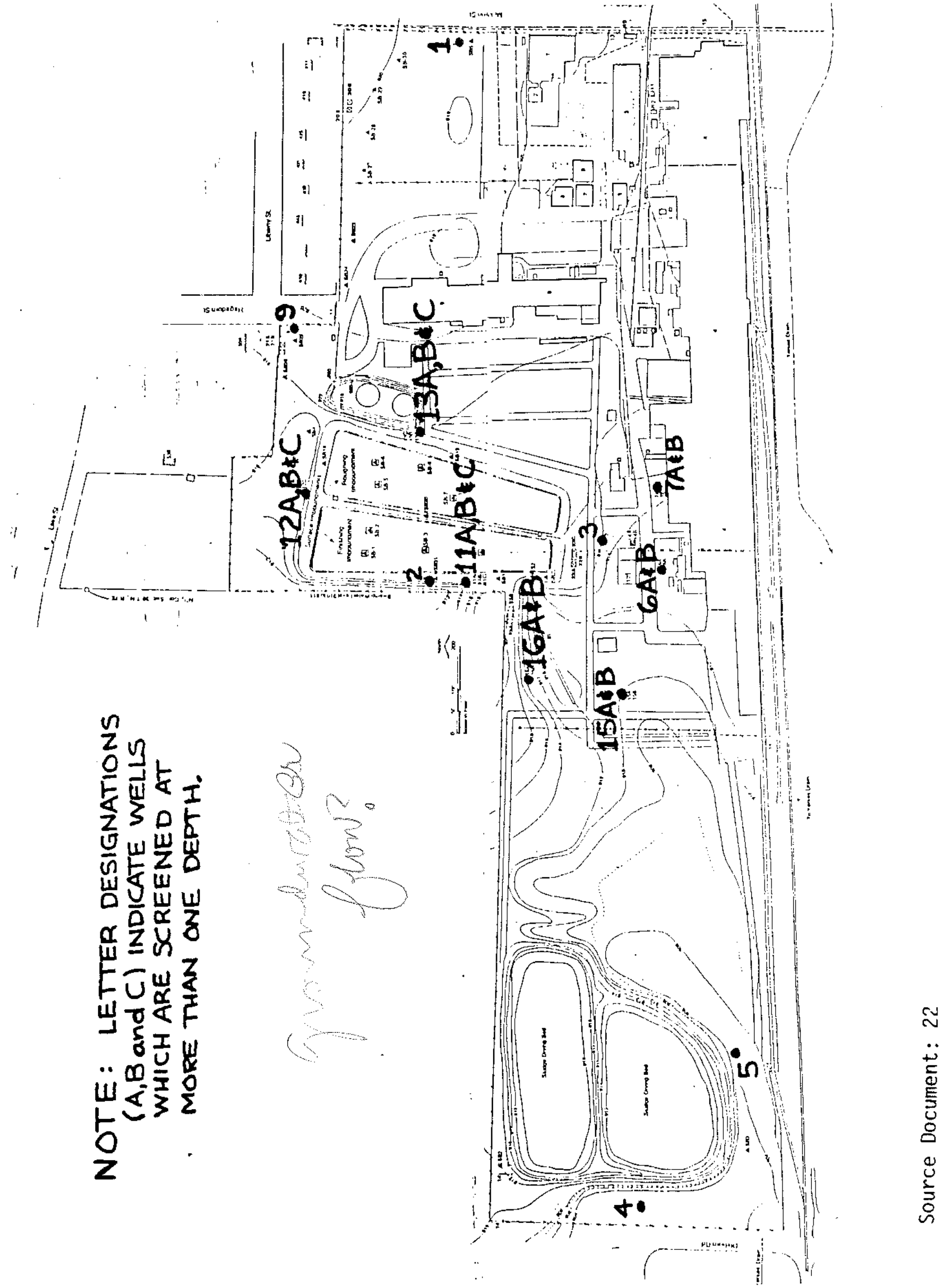

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FIGURE 5: Ground Water Monitoring Well Locations

SCALE: NONE

side and upgradient of Yerkes Drain, and are therefore not a potential receptor.

Rewrite paragraph chronologically

..4 Potential Releases into Surface Water

Quanex Corp - MST discharges treated process water into Yerkes Drain per NPDES permit. Several violations of this permit, including exceeding of limits set for suspended solids and total phosphorus, occurred from December 1988 through June 1989 (6,13). On August 22, 1989 a Notice of Noncompliance was issued by MDNR Water Resources Commission advising Quanex Corp - MST to return to compliance or face regulatory action (6). An oily film noticed in Yerkes Drain in early 1974 led to the discovery of a broken fuel line and a fuel oil release (36, 79).

2.4.1 Release Potential

NPDES Permit violations occurred after conversion from the use of large surface impoundments to using smaller volume clarifiers in the wastewater treatment process during November, 1988 (3). Reduction in wastewater volume discharge with no reduction in process solids and phosphorus caused exceedence of permit limitations. A limitation of 20 mg/L and 110 lbs/day as monthly averages for total suspended solids was exceeded by 19 to 21 mg/L and 183 to 232 lbs/day for four months, and a monthly average limitation of 0.25 mg/L for total phosphorus was exceeded for six months by 0.02 to 0.16 mg/L (6). The conversion to clarifiers also affected monitoring and the ability to compensate for problems before discharge (3). The potential for further releases from this source exists and therefore is closely monitored, regulated and reported. The fuel oil line has been disconnected from the source, release controls have been installed and no potential for release remains.

check to see if fail-safe

2.4.2 Monitoring Data

Daily samples are taken from the effluent and sent to the City of South Lyon Wastewater Treatment Plant (WWTP) for analysis. Results are recorded on bench sheets. Continuous-reading 24 hour strip charts are used to record pH. Records are available for the previous five years (10). Reporting of non-compliance events and submittal of Discharge Monitoring Reports are required in order to assure regulations are followed (3,6). Release control, collection and well monitoring for fuel oil are in place and small volumes of fuel oil, roughly 5 to 15 gallons, are typically collected during six month periods (35, 79). Monitoring well testing has found the fuel oil to be a high grade # 1,2 or 3 fuel oil (57).

2.4.3 Potential Receptors

Aquatic biota of Yerkes Drain and Inchwagh Lake are potential receptors.

2.5 Pollutant Releases into Air

Activity Reports from MDNR Air Quality Division (AQD) and VSI information indicate the following equipment is kept on their Emissions Inventory (EI): One packed tower acid mist scrubber for No.2 Pickle House; six acid pickle tanks, four with fan - drawn ventilation and two sharing two wet scrubbers; six roller hearth annealing furnaces; one lime silo with baghouse; two natural gas/oil boilers and rotary and walking beam reheat furnaces which share one stack (91,94,98,101,105,107-110). No releases from these sources have been reported. A complaint was received on August 10, 1987 regarding odors but no findings resulted (41).

how is "release" being defined?

2.5.1 Release Potential

how?

Equipment which is presently operating has potential for releases. ~~Continuance of past operating practice projects minimal potential for release.~~ There has been an odor complaint

2.5.2 Monitoring Data

Visual (opacity) only as required.

2.5.3 Potential Receptors

how close? map pls see with population

Due to the location of Quanex Corp - MST with respect to the City of South Lyon and given the predominant wind direction and proximity to residential areas, the people of South Lyon would be potential receptors.

2.6 Pollutant Releases into Soils

There have been six potential areas of pollutant release into soils reported. In late 1973 or early 1974 a buried fuel oil line ruptured, leaking fuel oil into the soil as described in Section 2.3 (36). Waste barium and corrosive solids within a hazardous waste storage pad (Area B) may have seeped into the underlying soil (43). Lead and manganese may have entered the soil surrounding two sludge drying beds (44). Two surface impoundments previously used to collect sludge waste contain a variety of metals which may enter the underlying soil (8). Three waste pickle liquor acid pits which operated for 34 years were closed without formal cleanup (62). Berm debris uncovered December 14, 1988 between the two surface impoundments may have leaked small amounts of toluene, lead, chromium and 1,1,1 trichloroethane as described in Section 2.3 (9,16).

2.6.1 Release Potential

what about pipe

The buried fuel line has been disconnected and is not a source for a potential release. The hazardous waste storage pad has been acceptably closed per MDNR and closure activities determined that no releases had occurred, so no release potential remains (117). Two sludge drying beds and two surface impoundments are in various stages of delisting, disposal or closure. Waste constituents for the lime stabilized waste pickle liquor sludge (LSWPLS) in the beds and impoundments have been shown to be immobile and thus release potential is limited (8, 33). Three waste pickle liquor acid pits were closed prior to 1968 before RCRA regulations were established, and potential for release is uncertain since these areas have been built over during plant expansions and closure/cleanup is not documented. The berm debris is still in place, awaiting MDNR approval for disposal, and release potential remains.

2.6.2 Monitoring Data

Berm soil and dried sludge samples taken from the site indicate elevated levels of lead (0.1 - 3.6 mg/L), toluene (0.039 - 0.14 mg/kg), chromium (0.07 - 0.08 mg/L) and 1,1,1 trichloroethane (0.083 - 0.12 mg/kg) in certain locations (See Appendix A). Leachate testing of the impoundment and drying bed sludges has found no constituents in excess of E.P. toxicity limits (8, 33). Drying bed sludge leachate samples have been found to exceed drinking water standard limits for manganese (0.04 to 1 mg/L detected) and for lead (0.11 to 0.47 mg/L detected) (44). Barium (1.1 mg/L), zinc (5.5 - 5.9 mg/L) and selenium (0.013 - 0.019 mg/L) at levels in excess of drinking water standards have been found in the impoundment sludge leachate, but are less than twice the allowable standard levels (8). See Appendix B for sample results for sludge and leachate constituent levels.

TCLP

2.6.3 Potential Receptors

Surface water, ground water and terrestrial biota in or on the soil are potential receptors.

2.7 Gaseous Pollutants into Subsurface Soils

No sources are known.

2.7.1 Release Potential

Volatilization of organic contaminants, if present, could cause potential for release.

2.7.2 Monitoring Data

No data is available.

2.7.3 Potential Receptors

Ambient air is a potential receptor if subsurface gases migrate to the surface and are released from the soil.

3.0 DESCRIPTION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

Four SWMU's and three Areas of Concern are identified at the Quanex Corp-MST site. These include surface impoundments, sludge drying beds, former acid pits, uncovered berm debris, two hazardous waste storage facilities, and an ~~old~~ fuel oil release area. See Figure 6 for locations of the SWMUs, Areas of Concern and plant process areas.

remove

3.1 Unit Type: Surface Impoundments

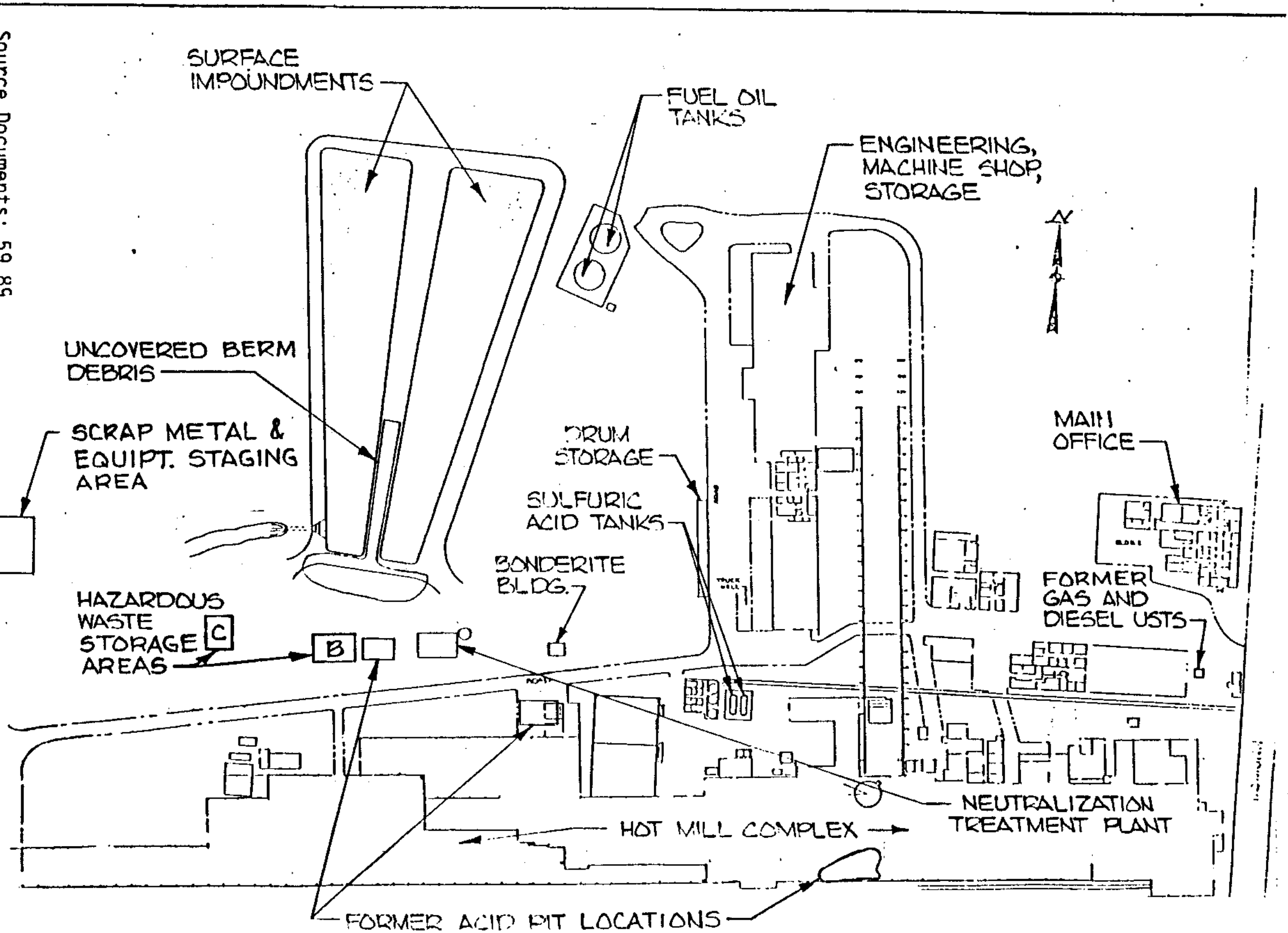
Regulatory status: SWMU. This area is inactive and undergoing closure (See Figure 6). A revised closure plan was conditionally approved September 24, 1987 (39). However, discovery of debris in the berm between the two impoundments, designation of the sludge as Type II waste by MDNR, and the submittal of a new closure plan for performing closure with sludge in place have left this issue awaiting MDNR consideration and approval/disapproval (4,9,12).

A. Unit Description: The two surface impoundments are each 550 feet long and tapered from 125 feet to 50 feet end to end. The total depth of the impoundments was uncertain due to previous dredging operations, but sludge depth in the finishing (western) lagoon was estimated during the VSI at 3 feet and estimated at being anywhere from 7 to 14 feet in the roughing (eastern) lagoon. The impoundments were used to collect sludge from the settling of lime-treated wastewater flocculants and for retention of the liquid effluent prior to discharge via the NPDES permit. See Appendix C Photographs 6 and 7 for surface impoundments.

where did the dredged material end up?

B. Period of Operation: 1970 - 1988

P. 24 notes that VOCs were detected in debris. Were they tested for in all SWMUs?



Source Documents: 59,85

M&E METCALF & EDDY

FIGURE 6: Locations of SWMUs, Areas of Concern And Process Areas

SCALE: NONE

C. Waste Type: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation and was delisted by the U.S. EPA effective December 5, 1984. Was the waste pre delisting? was the waste in place delisted? was the waste delisted after 12/5/84 w/ all waste pre 12/6/84 still hazardous?

yes for everything

Waste Volume/Capacity: 46,900 Cubic Yards (CY) after stabilization with flyash (estimated).

says who?

TCLP?

Waste Constituents: LSWPLS contains many constituents in an immobile form (8, 33, Appendix B). Possible waste constituents; including cadmium, copper, lead, nickel, silver and zinc, are detectable in E.P. Toxicity leachate but are also below the lower limit for E.P. Toxicity hazardous classification. How were the samples collected & how many for the EP Tests? Is it guarenteed to be represantable samples.

D. Release Controls: Impoundments have release gates for liquids but do not have clay liners. Sludge has been stabilized with flyash.

E. Release History: No releases have been reported. Clarified free liquid has been discharged per NPDES permit. Normal operations occurred where sludge was removed by dredging from 1971 to 1975 and by pumping from 1975 to 1987 and placed in sludge drying beds on-site. Any adjacent gwm wells?

needs g.w. samples

F. Conclusions: Sludge disposal or in-place closure is awaiting MDNR response to a Type III Designation Petition and a closure plan (4, 8). Delays on the designation petition determination may be due to the present lack and current development of definite constituent levels and limits for classification of Type III wastes by MDNR. ~~Release potential appears low.~~

G. Observations: Impoundments do not have clay liners.

If it can be stated w/o question that the Samples were representative of the sludge, then it is safe to conclude that it is below EP Tox

H. Sample Results: Cadmium, copper, lead, nickel, silver and zinc are detectable in E. P. Toxicity leachate at less than hazardous levels. See Appendix B.

3.2 **Unit Type: Sludge Drying Beds**

Regulatory status: Area of Concern. This area is inactive. The sludge was delisted from the proposed K063 hazardous waste designation by the U.S. EPA in 1984 and although the sludge has been found not to be inert, Quanex Corp MST submitted a Type III Designation Petition on January 29, 1988 for MDNR consideration prior to conducting disposal activities (33,44). See Figure 3 for location of drying beds.

See D.

A. Unit Description: The northern bed is approximately 500 feet long (east to west) by 160 feet wide (north to south) with a sludge depth of about 9-14 feet. The southern bed is approximately 325 feet long (east to west) and 225 feet long (north to south) with a sludge depth of about 7-10 feet (50). This area was used to dewater sludge transferred from two surface impoundments. See Appendix C Photographs 25 and 26 for sludge drying beds.

B. Period of Operation: 1970 - 1987

C. Waste Types: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation and was delisted by the U.S. EPA effective December 5, 1984. see note on opposite page

Waste Volume/Capacity: Approximately 80,000 CY spell out

Waste Constituents: LSWPLS contains many constituents in an immobile form (8,33,Appendix B). Possible waste constituents; including barium, cadmium, copper, lead, manganese, nickel, silver and zinc, are detectable in E.P.

Toxicity leachate but are also below the lower limit for E.P. Toxicity hazardous classification.

D. Release Controls: Groundwater monitoring wells are located to the south and west. Sludge has not been stabilized with flyash. thus "not ... inert"

E. Release History: None known.

F. Conclusions: Further action is contingent upon MDNR response to the Type III delisting petition. Release potential appears low.

G. Observations: Beds have berms but not clay liners.

H. Sample Results: Barium, cadmium, copper, lead, manganese, nickel, silver and zinc are detectable in E.P. Toxicity leachate at less than hazardous levels. See Appendix B.

3.3 **Unit Type: Former Acid Pits** — SWMUs

Regulatory status: Area of Concern. These areas are inactive and underwent closure prior to existence of formal closure regulations. As shown in Figure 6, these pits have been covered over during plant expansion activities.

A. Unit Description: The three pits were approximately 80 feet by 80 feet by 6 feet deep and contained waste pickle liquor sludge which may have been treated by lime (64).

B. Period of Operation: Approximately 1935 to 1969

C. Waste Type: Lime stabilized waste pickle liquor sludge (LSWPLS).

Waste Capacity/Volume: Approximately 1400 CY

Waste Constituents: LSWPLS sample test data not available. More-recently produced LSWPLS in the drying beds and impoundments contain a variety of metals, ~~many of which are immoble.~~ what makes them immobile

D. Release Controls: Groundwater monitoring has shown no evidence of releases. Briefly describe what gwm system is in place to detect releases.

E. Release History: None known.

F. Conclusions: Exact pit locations are uncertain and two of the pits appear to have been built over during plant expansions. Groundwater monitoring has shown no evidence of contamination. would the present gwm system be adequate to detect any/all releases?

G. Observations: Detecting the lack or presence of LSWPLS constituents in the former pit areas might be a good indication of potential for long-term releases from the impoundment and drying bed sludges since the use and closure of the pits occurred long ago (1935-1969).

H. Sample Results: Monitoring wells 3,7A and B, and 14A and B near two of the former pit locations have found no levels of contaminants elevated above background levels measured in Wells 1 and 2 (See Figure 5) (32, 60). The contaminants present include sodium, barium, chromium, fluoride, chloride, manganese, and phenols in levels close to non-detectable and naturally occurring iron, arsenic and sulfate in slightly higher quantities (32, 60). attach data

which are up/down gradient?

does DNR concur

3.4 Unit Type: Uncovered Berm Debris

Regulatory status: <u>SWMU</u>. Scrap metal and drum remnant debris was discovered during sludge solidification for closure of the two surface impoundments. Removal and disposal of the material is awaiting a response to either a March 24, 1989 work plan submitted to MDNR or an amended closure plan for the surface impoundments submitted in August 1989 to MDNR (4,9).

A. Unit Description: The debris is located in the berm and southern end of the two surface impoundments (See Figure 6). Origin is unknown and presumed to be historic dumping from a staging area for scrap metal. See Appendix C Photographs 9 and 10 for berm debris.

B. Period of Operation: Unknown

C. Waste Type: Solid wastes including steel scrap and drum remnants.

Waste Volume/Capacity: Unknown, preliminary debris area is 180 feet long and berm is approximately 20 feet wide (14).

Waste Constituents: Toluene; 1,1,1 trichloroethane; chromium, and lead. [illegible] A

D. Release Controls: Groundwater monitoring wells are located nearby (See Figure 5 and Appendix A).

E. Release History: Unknown. Due to nearby location of the scrap metal and retired equipment dismantling area, it is speculated that some of this material was used during construction of the berms for the surface impoundments.

F. Conclusions: The debris is anticipated to be disposed of as a Type II waste upon MDNR approval of a March 24, 1989 work plan. Additional sampling during excavation and disposal is proposed (9).

G. Observations: Scrap metal debris was observed on the berm surface.

H. Sample Results: Toluene, 1,1,1 -trichloroethane, chromium and lead have been found in soil and dried sludge samples. Groundwater testing has found nothing. Contaminant levels did not exceed E.P. Toxicity allowable levels (9). See Appendix A.

3.5 Unit Type: Hazardous Waste Storage Facility B

Regulatory status: SWMU. This facility stored barium and corrosive materials on a concrete pad (43). The facility has been removed and clean closed. Closure certification was accepted when MDNR released Quanex Corp-MST from financial responsibilities regarding the closed unit (1,117).

A. Unit Description: Area B was a fenced-in drum storage pad, 40 feet by 40 feet. See Figure 7 and Appendix C Photograph 11 for the former location of the pad.

B. Period of Operation: 1984-1989.

C. Waste Type: Hazardous spent materials.

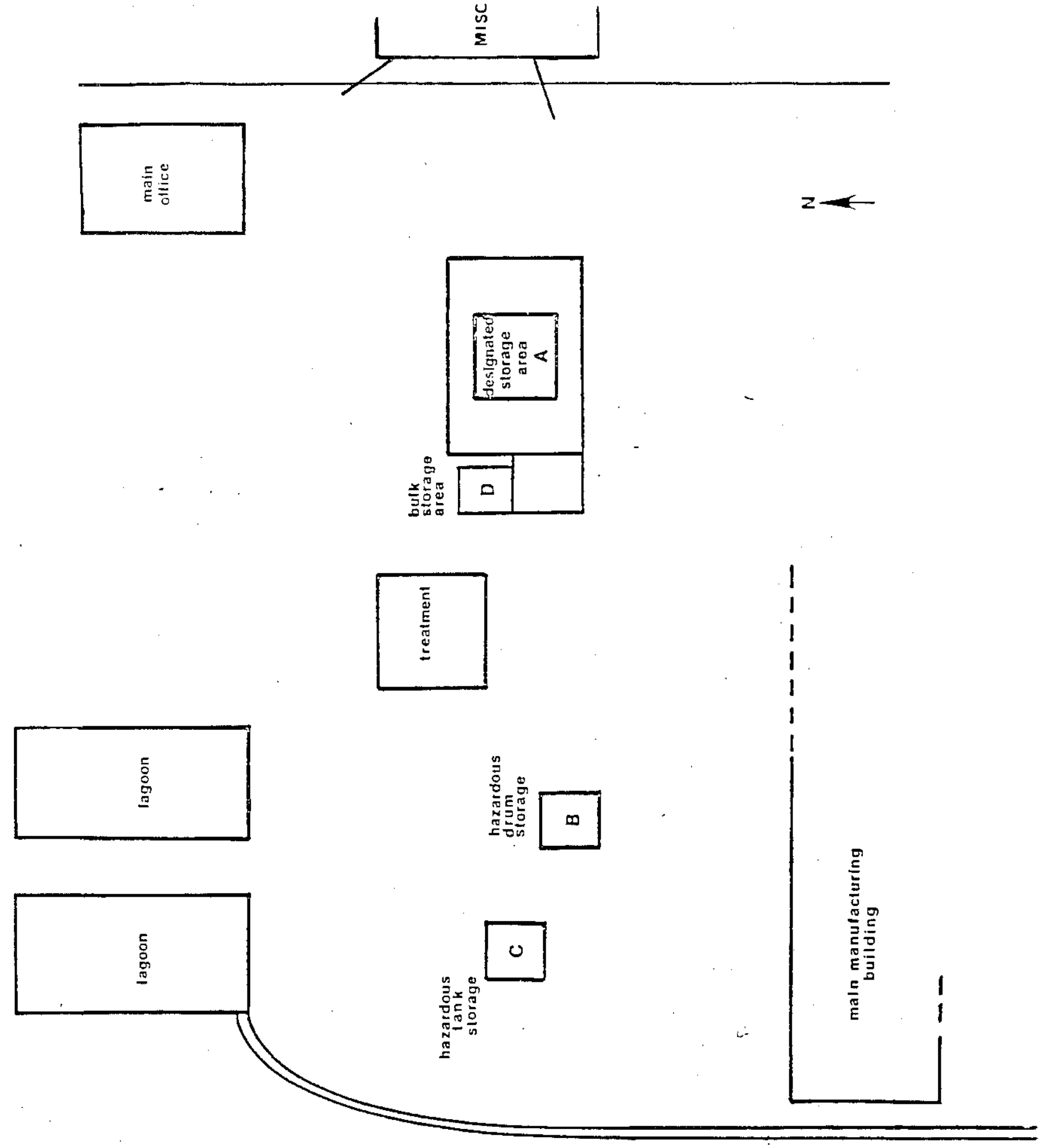
Waste Volume/Capacity: Approximately 110 gallons of barium and 2 CY of corrosive materials.

Waste Constituents: Waste barium (D005) and corrosive solids (D002).

D. Release Controls: The Area B pad has been removed and clean closed per MDNR release of Quanex Corp - MST from financial responsibilities regarding the closed unit.

E. Release History: No releases have occurred.

F. Conclusions: Area B has been removed and clean closed, no further action is necessary.



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METCALF & EDDY

FIGURE 7: General Layout Of Hazardous Materials Storage Areas B&C

SCALE: NONE

G. Observations: Area B is currently a clean gravel lot next to a fenced empty drum storage area.

H. Sample Results: The Area B pad has been removed and it was reported during the VSI that cleanup analyses confirmed that releases of barium and corrosives had never occurred.

3.6 Unit Type: **Hazardous Waste Storage Facility C and Sump**

Regulatory status: <u>SWMU</u>. Area C is active and is used for the temporary storage of waste oil and drum solvents for less than 90 days (64,80).

A. Unit Description: Area C is a spent-oil and solvent drum/tank storage pad including a 10,000 gallon aboveground tank for waste oils and an area for spent-solvent drums. This area also has a surfacewater runoff collection system and sump. See Figure 7 and Appendix C Photographs 13 and 14 for Area C location and details.

B. Period of Operation: 1979 - Present

C. Waste Type: Waste oil and spent solvents.

Waste Volume/Capacity: 10,000 gallons of waste oil and approximately 35 drums.

Waste Constituents: Spent petroleum products and solvents.

D. Release Controls: Area C is diked for 150% containment and has a sump for runoff and spill collection. — when was it diked?

E. Release History: No known releases have occurred.

Could there have been releases prior to diking?

F. Conclusions: Area C is active for waste storage for less than 90 days, no releases have been reported and potential spills are likely to be contained. No further action appears necessary.

G. Observations: Approximately 35 drums were in Area C during the VSI. The amount, level, etc. of waste in the drums and the 10,000 gallon tank is uncertain. Area C has a total capacity of more than 35 drums but a total capacity figure has not been documented.

H. Sample Results: Sample taking and testing have not been performed for Area C.

3.7 Unit Type: Old Fuel Oil Release Area

Regulatory status: Area of Concern. Inactive area of previous fuel oil spillage. Discovery of fuel oil in Yerkes Drain in 1974 was traced to a ruptured line beneath the Quanex mill building. Spillage was a one time occurrence. Release controls and collection equipment installed between the point of release and Yerkes Drain have recovered about 290,000 gallons of fuel oil and currently collect about 10 gallons every six months. Any idea on how long the release was active?

A. Unit Description: Area from point of release beneath main mill building to Yerkes Drain (See Figure 4). See Appendix C Photographs 22-24 and 27 for photo details.

B. Period of Operation: 1973-74 to present

C. Waste Type: Fuel oil.

Waste Volume/Capacity: Approximately 200,000 - 500,000 gallons (reported as 280,000 gallons during VSI).

Waste Constituents: Fuel-related hydrocarbons

D. Release Controls: Monitoring wells, pea-gravel trench interceptor, ground water baffle, caissons and float oil skimmers.

E. Release History: Release occurred in late 1973 or early 1974 and was discovered on March 9, 1974.

F. Conclusions: Fuel oil recovery continues to occur in small quantities. Controls and collection appear adequate. — by what criteria?

G. Observations: Oily film was not observed on the water in Yerkes Drain.

H. Sample Results: Information on soil and water sampling reported the fuel oil to be a high grade # 1,2, or 3 fuel oil but levels of fuel oil were not provided (57).
T?

4.0 SUMMARY AND RECOMMENDATIONS

The principal environmental concerns at the Quanex Corp - MST facility involve unresolved determinations of status for the surface impoundments, sludge drying beds, and uncovered berm debris. The VSI provided information which verified the file information and revealed additional information necessary for a complete update and status check of all areas considered. A summary of, and recommendations for, each SWMU and Area of Concern, including possible sampling or further analysis required, is provided as follows:

If MDNR agrees to classify the sludge as Type III waste, no further sampling will be necessary

1. Surface Impoundments: MDNR acceptance of the Type III designation and the in-place closure plan for the sludge may relieve the need for additional testing, but denial of the Type III designation and closure plan should result in the performance of testing during the sludge removal and disposal. Sampling coordinated ~~and consistent with MDNR determinations and actions in either case should be done with U.S. EPA concurrence.~~

testing of what?

2. Sludge Drying Beds: MDNR acceptance of the Type III designation for the sludge may relieve the need for additional testing, but denial of the Type III designation should result in the performance of testing during the sludge removal and disposal. ~~Sampling coordinated and consistent with MDNR determinations and actions in either case should be done with U.S. EPA concurrence.~~ ~~MI~~ has base program authorization and does not need USEPA concurrence.

3. Former Acid Pits: The locations of the former acid pits are uncertain, closures (of unknown degree) have been reported, the pits' contents appear to have been non-hazardous LSWPLS and groundwater monitoring has revealed no concerns. However, since little information is available and testing at these potential sources might reflect the long-term effects of the drying bed and impoundment sludges, sampling is recommended.

4. Uncovered Berm Debris: MDNR determination regarding the proposed work plan for the debris removal and disposal should be completed with U.S. EPA concurrence. Soil sampling during removal of the debris in accordance with MDNR determinations and actions should be performed with U.S. EPA concurrence.

5. Hazardous Waste Storage Facility B: No action appears to be necessary.

6. Hazardous Waste Storage Facility C: Area C is active and no releases have been reported. No action appears to be necessary. If future spills or leaks occur they should be reported, documented and cleaned up.

7. Old Fuel Oil Release Area: No action appears to be necessary. Continue to monitor reports of fuel oil recovery from collection system.

TABLE 1

QUANEX CORP - MST
SOUTH LYON, MICHIGAN
SOLID WASTE MANAGEMENT UNITS SUMMARY

Solid Waste Management Unit	**Operational Dates**	**Release History**	**Suggested Further Action**
Surface Impoundments	1970 - 1988	Unknown or no release? None. Free liquid was discharged to Yerkes Drain per NPDES permit and sludge was put in sludge drying beds. Remaining sludge has been designated as Type II waste thus far.	MDNR Determination on Type III designation and amended plan for closure in-place of sludge ~~with U.S. EPA concurrence~~. Possible subsequent sampling and testing.
Sludge Drying Beds	1970 - 1987	None known. Sludge has been determined not to be inert. actually "inert" may not be the best word. It suggests that it is harmful. "NOT stabilized" may be better	MDNR Determination on Type III designation petition ~~with U.S. EPA concurrence~~. Possible subsequent sampling and testing.
Former Acid Pits	1935 - 1969	None known.	Soil boring and sampling.
Uncovered Berm Debris	Unknown	Unknown. May have occured during surface impoundment construction.	Approval/disapproval of proposed work plan ~~with U.S. EPA concurrence~~. Soil sampling during excavation and disposal.
Hazardous Waste Storage Facility B	1984-1989	None known. (Testing for closure of Area B confirmed no releases.) - put in text	None.
Hazardous Waste Storage Facility C and Sump	1979 -Present	None Known.	None.
Old Fuel Oil Release Area	1974-Present	Release occurred during late 1973 or early 1974.	None.

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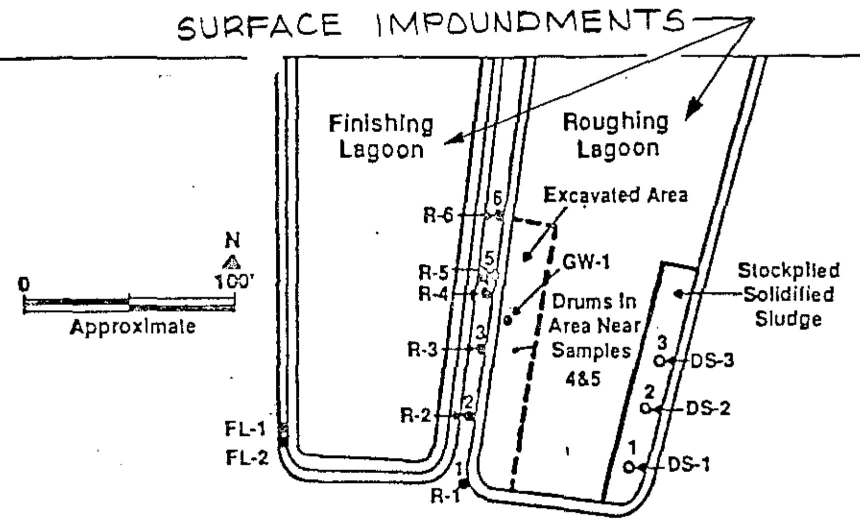
APPENDIX A

UNCOVERED BERM DEBRIS SAMPLING TEST RESULTS (REF. 9)



how were chemicals chosen?

R-1	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.39

R-2	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.14

R-3	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.50

R-4	Roughing Lagoon
Toluene	0.059
1,1,1 - Trichloroethane	0.083
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

R-5	Roughing Lagoon
Toluene	0.043
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	0.07
Lead (E.P. Tox)	0.10

R-6	Roughing Lagoon
Toluene	0.039
1,1,1 - Trichloroethane	0.12
Chromium (E.P. Tox)	0.08
Lead (E.P. Tox)	3.6

GW-1	Groundwater
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (Totals)	*
Lead (Totals)	*

FL-1	Finishing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

FL-2	Finishing Lagoon
Toluene	0.08
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-1	Dried Sludge
Toluene	0.09
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-2	Dried Sludge
Toluene	0.14
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-3	Dried Sludge
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

Metals Results in mg/l
Volatile Results in mg/kg
* Non-Detect

units?

what does * stand for?

d.l.s?

Figure 1

Berm Sampling Locations and Analytical Results
Quanex Corporation

January, 1989 — 21086

EDI Engineering & Science

SOURCE: 9

Soil or groundwater?

APPENDIX B

SLUDGE BEDS AND IMPOUNDMENTS:

CONSTITUENT LEVELS
(REF. 44, 50)

SLUDGE DRYING BED: SLUDGE SAMPLE CONSTITUENTS

some people may miss the different conc.

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.0.5	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	<0.05	<0.08	<0.05	<0.06	0.21	0.11	<0.05	0.15	0.47	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	0.01	<0.01	0.04	<0.01	0.02	0.02	<0.01	<0.01	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	<0.02	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	----	Stnd. Units

Maybe a note about the units for As, Hg, and Se being ug/l rather than mg/l.

SOURCE: 44

PARAMETER	04/29/87 BORING 4 Composite 0-8.0'	04/29/87 BORING 4 8.0-9.5'	04/29/87 BORING 4 9.5-10.0'	04/29/87 BORING 5 Composite 0-8.0'	04/29/87 BORING 5 8.0-9.2'	04/28/87 BORING 6 1.5'	04/28/87 BORING 6 5.0'	04/28/87 BORING 6 7.5	04/28/87 BORING 6 9.75'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.12	0.14	1.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.42	0.29	<0.01	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	<0.02	0.04	0.07	0.05	0.10	0.03	<0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	----	Stnd. Units

SOURCE: 44

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.05	0.21	<0.01	1.0	0.07	<0.01	0.04	0.11	0.08	0.01	mg/L
Zinc	<0.02	0.02	0.02	0.04	0.03	<0.02	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	----	Stnd. Units

SOURCE: 44

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

date?

TO:

Results of Analyses "As Collected" Sludge Samples **Date:**

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids, %	pH
West Lagoon						
Quadrant 1.	65	2.4	47	<0.5	--	--
Quadrant 2.	200	32	120	<0.5	--	--
Quadrant 3.	68	<2	52	<0.5	--	--
Quadrant 4.	73	3.6	58	<0.5	--	--
Composite	--	--	--	--	26.9	7.5
East Lagoon						
Quadrant 1.	180	4.6	81	<0.5	--	--
Quadrant 2.	160	6.2	90	<0.5	--	--
Quadrant 3.	72	<2	45	<0.5	--	--
Quadrant 4.	160	<2	72	0.6	--	--
Composite	--	--	--	--	29.7	8.0

* All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Date:

Results of Analyses "As Collected" Sludge Samples

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

Results of EP Toxicity Procedure

TO:

Table II

Date:

Parameters:	West Lagoon Composite (FINISHING IMPOUNDMENT)	East Lagoon Composite (ROUGHING IMPOUNDMENT)	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

SOURCE: 50

APPENDIX C

PHOTOGRAPH LOG

APPENDIX D

VSI FIELD LOG NOTES

9/5/90
TPSKM

Quanex VSI
PR Review Notes

Sect 1.0 – HW Area B has been cleaned to background for barium

Sect. 2.0 – Sludge drying beds are not undergoing closure as they are not regulated, no action is being done or is planned, pending decision on delisting petition

Sect. 2.1 – Sodium stearate is used in conjunction with zinc phosphate
– salt pot waste is non-hazardous since mat'l change from barium, commercial product residues in drum liners are of no longer any concern.

Sect. 2.2 – Prefer "swampy area" name to "wetland" which may imply something which is untrue.

Sect. 2.2.2 – Since the impoundments have not contained liquid for some time, a groundwater mound beneath them may no longer exist.
– 4.5 ft/day seems high, check this number, make sure that it is a flow velocity and not a permeability

Sect. 2.3 – Fuel oil release volume was 280,000 gallons, not 420,000.

Sect. 2.3.3 - 1st sentence may not apply since collection equipt. is in place

Sect. 2.4.3 - Yerkes Drain and Inchwagh Lake

Sect. 2.5 - Four pickle tanks have fan ventilation and two share a scrubber, there are six annealing furnaces now and the burners are actually boilers. Note that the boilers are natural gas run and oil is only kept on line in case of an emergency. Also have 2 reheat furnaces, a rotary and walking-beam furnaces, which share one stack.

Sect. 2.5.2 - No testing has been found to be necessary, no complaints, only testing which would be done is if an emission problem was visual.

Sect. 2.6 - Seeping from HW Area B is speculation only, the closure testing proved otherwise.

- S.D. Beds & impoundment sludge constituents are immoble, check & verify this release info.!

Sect. 2.6.1 - HW storage Area B was certified closed by MDNR on 2/5/90.

- impoundments are inactive & stabilized

2.6.1 (cont.). - and therefore practically closed but not "officially" certified closed.
- former acid pits may have contained treated K062 wastes as did surf. impoundments.
- surf. impoundments have not been cleaned up, just stabilized

Sect. 2.6.2 - Make a <u>very</u> clear distintion between what was found in the soil and what was found in the sludge.

Sect. 2.7.1 - No source existing

Sect. 2.7.2 - No monitoring since no source

Sect. 3.1 - State certified as Type III (?) & not inert

Sect. 3.1A - Impoundments were used for retention but not make for that purpose. Sludge depth in finishing lagoon ≈ 3' and in roughing lagoon ≈ 7'-14'.

Sect. 3.1C - K063 waste type was proposed only, never official
- delisted in 1985 or 1984? check
- Volume approx 46900 CY after stabilization.
- Constituents - LSWPLS, be <u>very</u> careful as the word "constituents" implies something which may not be true with LSWPLS immobilized contents

rephrase

Sect. 3.1D - release gate / decant structure
- clay liner may have been used (was in constrction plans).

Sect. 3.1E - why are normal operations considered a release?

Sect. 3.2 - Not undergoing closure
- Type III Desig. Petition is pending still.

Sect. 3.2A - sludge depth in the southern bed may be less than 9'

Sect. 3.2C - K063 was proposed only
- no flyash stabilization was done here
- 55,000 cy may be low
- rework with new understanding of constituent considerations

Sect. 3.3 - pits have been buried during plant expansions

Sect. 3.3A - check dimensions, actual are unknown

Sect. 3.3B - Pits may have been ~~are~~ constructed from east to west as the plant expanded until finally the impoundments were constructed.

Sect. 3.3C - LSWPLS (neutralized acid with lime).

Sect. 3.3E - GW monitoring shows no releases

Sect. 3.4 - eliminated, not a SWMU or Area of Concern

Sect. 3.5 - Not a debris pile, just debris
- waiting for approval of a work plan

Sect. 3.5 A - historic staging area for scrap.

Sect. 3.5C - 30-40 feet long, not 180 feet

Sect. 3.6 B - B: 1985-89
C: 1980 - present

Sect 3.6 C - B: only barium & corrosives, short term (one time only), ≈100 gal Ba (2 drums)
C: waste oil; 10,000 gal tank

Sect. 3.6 D - 150% containment

Sect. 3.6E - No releases from either.

Sect. 3.7 - Remove from report

Sect. 3.8 - USTs removed 10/88 under LUST program, remove

Sect. 3.9, 3.10, 3.11, 3.12, 3.13 & 3.15 → remove from report, process areas not SWMUS.

Sect. 3.14A - mill bldg, not main office

Sect. 3.14C - 280,000 gallons, not 420,000

Sect. 3.15 → filter press sludges shipped to Type II landfill.

5 Sept 90

1. HW Container Storage Unit Closure approved by MDNR. Q will send ~~letter.~~ → Given copy during mtg.

2. Sludge drying beds do not have a closure plan. Q is trying to get Type III designation.

3. WW flow is 1 MGD.

4. Sodium sterate is used in addition to zinc phosphate.

5. Residents have city water. Groundwater wells for watering purposes.

6. 0.1 Spill was between 280,000 - 420,000 gallons
Send File

7. Section 2.3.1 Q waiting for cleanup approval for debris located in surface impoundment.

8. Old NPDES permit has been extended. New permit has been applied for that will reduce discharge & increase concentration.

9. Surface impoundments have been treated with lime to stabilize.

10. Not a debris pile. (2.6)

11. Storage pad has been closed & certified.

12. (2.6.1) Closed but certification is pending.

13. (2.6.1) Spent pickle liquor can release zinc, chromium & lead.

14. (2.6.2) Clarify to specify where contaminants come from. (Soil & Sludge)

15. (3.1 Surface Impoundments) MDNR approved material as Type III ~~10 to 15 feet deep~~
K063 was proposed number only
Lime stabilized pickle Liquor. sludge.
Gate was used to release effluent, Clay line

16. (3.2 Sludge Drying Beds) ~~Closure pending~~ Closure not required because sludge is Type III.
Same but has not been solidified.
May Remove.

17. (3.3 Acid Pits) Nuetralized w/ lime. May have been excavated. during construction.
Lime stabilized pickle liquor sludge.

18. 3.4 (Former Landfill / Wastepile)
Retired equipment

NPDES Permit

19. (3.5 Uncovered Debris Pile)

20. (3.6 Former HW Container Storage Facilities)

21. 3.8 Contaminated soil removed.

CHECK W/ GARY ABOUT REVIEW

Call Mr. Comfort.

M&E
TPSKI
9/5/90

Quanex Corp- MST Photolog

Picture No.	Description
8	Fuel Oil Tanks
9	Oil & Lubricant Drum Storage
10	Sulfuric Acid Storage Tanks
11	Bonderite Storage Tanks
12	Neutralization Plant
13 & 14	Surface Impoundments
15	Filter Press (2 in place, one not photographed)
16 & 17	Uncovered Berm Debris
18	HW Storage Area B (former loc.)
19	Empty barrel storage area adjacent to Area B
20 & 21	Area C-HW Storage Area, Waste Oil tank & drums (note sump).
22, 23 & 24	Retired equipt. & scrap metal area
25	outfall drainage & culvert to Yerkes Drain
26	New above-grade fuel oil & gasoline tanks (replaced USTs which were removed in another location).
27 & 1 (New Roll)	Former location of USTs for fuel oil & gasoline (removed under LUST program).

9/5/90

Photo	Descript.
2	Fuel oil interceptor/collection equipt. near Yerkes Drain
3	Yerkes Drain
4	Outfall into Yerkes Drain from plant property
5	Northern-most sludge drying bed
6	North drying bed, south bed is just beyond berm shown.
7	Absorbant oil boom on Yerkes Drain

U.S. ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES X

CONTRACT NO. 68-W9-007
WORK ASSIGNMENT NO.R05043

PRELIMINARY REVIEW/VISUAL SITE INSPECTION (PR/VSI) REPORT FOR RCRA FACILITY ASSESSMENT (RFA) AT QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION SOUTH LYON, MICHIGAN

U.S. EPA REGION V

METCALF & EDDY, INC.
PROJECT NO. 150043-0031-626

WORK PERFORMED BY:

METCALF & EDDY OF MICHIGAN, INC.
1101 WASHINGTON BLVD., SUITE 400
DETROIT, MICHIGAN 48226

FEBRUARY, 1991

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EXECUTIVE SUMMARY

As a part of the PR/VSI conducted at the request of U.S. EPA, Metcalf & Eddy performed a preliminary review of federal and state file material for the Quanex Corporation - Michigan Seamless Tube facility (MID 082 767 591) and performed a visual site inspection of the facility. These activities were performed in order to summarize available information concerning the site and to assist the U.S. EPA in recommending further steps in the corrective action process. Quanex Corp. - MST is located at 400 McMunn St. in South Lyon, Michigan. The facility manufactures seamless steel tubing from round steel bars.

Manufacture of tubing at Quanex Corp. - MST produces an acidic wastestream which is lime stabilized on site. The stabilized waste was once pumped to two on-site surface impoundments where a lime stabilized sludge settled out of solution and water was discharged per NPDES permit to Yerkes Drain. The impoundments use has since been replaced by using a treatment plant with clarifiers and filter presses.

The two impoundments presently contain stabilized sludge from previous operations. Two sludge drying beds, which received periodic dredgings of sludge from the impoundments in the past, are also present at the facility. A fuel oil leak into Yerkes Drain from a below-grade pipe was discovered in 1974. A hazardous waste storage pad has been removed. A waste oil and solvent area is presently active. A waste pile/landfill for scrap equipment and materials is present on site. Also, scrap metal and drum debris has been found in a berm which separates the two surface impoundments.

Fifteen Solid Waste Management Units (SWMUs) were tentatively identified, based upon file reviews (see Table ES-1). Based on the VSI, the number of SWMUs was reduced to ten since many of the areas were found to be new/unused process material storage areas.

TABLE ES-1

QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE
CURRENT SOLID WASTE MANAGEMENT UNITS

SOLID WASTE MANAGEMENT UNIT	OPERATIONAL DATES	RELEASE HISTORY
* Surface Impoundments	1970-1988	- Sludge to drying beds from 1971-1987, liquid to Yerkes Drain per NPDES permit.
* Sludge Drying Beds	1970-1987	- None known.
* Former Acid Pits	1935-1969	- None known.
* Landfill/Wastepile	1967(?)-1977/1977-1985(?)	- None known.
* Uncovered Berm Debris	Unknown	- Unknown. Possible origin from Landfill/Wastepile.
Hazardous Waste Container Storage Facilities	*Area B: 1985-1989 *Area C: 1980-Present	- None reported. - None known.
Sulfuric Acid Storage Tanks	? - present	- None known.
Underground Storage Tanks for Gasoline and Fuel Oil	? - present	- None known.
Fuel Oil Tanks	? - present	- None known.
Oil and Lubricant Drum Storage Area	? - present	- None known.
Bonderite Storage Tanks	? - present	- None known.
PCB Transformers and Capacitors	? - present	- None known.
* Neutralization Plant	Unknown	- Discharge to surface impoundments, 1970-1988 and to clarifiers, 1988-present.
* Fuel Oil Release Area	1973-74 to present	- Release of 200,000 to 500,000 gallons of fuel oil was discovered March 9, 1974.
* Filter Press	1988-present	- None known.

*Indicates SWMUs identified during the file review and confirmed during the VSI

PRELIMINARY REVIEW/VISUAL SITE INSPECTION (PR/VSI) REPORT
RCRA FACILITY ASSESSMENT (RFA)

FACILITY NAME:	**QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION SOUTH LYON, MICHIGAN**
	LATITUDE N42° 27' 21" **LONGITUDE W83° 39' 45"**
SITE CONTACT:	**CHARLES SIMPSON**
PHONE:	**(313) 486-0100**
EPA ID #:	**MID 082 767 591**

1.0 INTRODUCTION

This report was prepared by Metcalf & Eddy, Inc. under the Technical Enforcement Support (TES) X contract at the request of the United States Environmental Protection Agency (U.S.EPA) Region V. It describes the Preliminary Review (PR) of file material for the Quanex Corporation- Michigan Seamless Tube (MST) facility and the Visual Site Inspection (VSI) of the facility. These are the first two steps in conducting a Resource Conservation & Recovery Act (RCRA) Facility Assessment (RFA). The format of this document is in accordance with U.S. EPA guidance on conducting and documenting an RFA. The purpose of this report is to summarize available information about the site and to assist the U.S. EPA in recommending further steps in the corrective action process.

Metcalf and Eddy (M&E) performed a file review of the Quanex Corp - MST files at the Michigan Department of Natural Resources (MDNR) office located in Lansing, Michigan, and the U.S. EPA Region V RCRA files located in Chicago, Illinois. Fifteen Solid Waste Management Units (SWMUs) were tentatively identified based on the file information. M&E performed the VSI on September 5, 1990 to verify the file information and initial conclusions regarding the SWMUs and identify other SWMUs, if present. The M&E site inspectors, Brice Birkhofer and Thomas Pawlowski, were met by the following persons representing Quanex Corp - MST: Mr. Charles Simpson, Quanex Corp. Chief Engineer, Mr. Donald Comfort, Quanex Corp. Engineering Manager; Mr. William Merchant, Quanex

Corp. Plant Engineer; Mr. Dennis Hatfield, Principal of Patterson Schafer Inc., environmental consultants; and Mr. Roger Patrick, Quanex Corp. Counsel from Sonnenschein Nath & Rosenthal. Based on the VSI, the number of SWMUs and was changed from fifteen to ten because many of the initially identified areas were found to be new/unused process material areas. An example of this would be existing sulfuric acid process tanks. No new SWMUs were identified during the VSI.

This report summarizes file information related to releases of hazardous wastes at the Quanex Corp - MST facility. Releases into all media are considered, including air, surface water, ground water, soils, and subsurface gases. All areas of potential release are considered, but the focus is on Solid Waste Management Units (SWMUs). SWMUs are defined as any discernible waste management unit at a RCRA facility from which hazardous constituents might migrate, irrespective of whether the unit was intended for the management of solid and/or hazardous waste.

Section 2.0 of this report provides an overall facility description. Facility operations, environmental characteristics, and potential releases are described from a facility-wide perspective. Detailed discussion of each SWMU are provided in Section 3.0. Section 4.0 summarizes the information given in Sections 2.0 and 3.0 and provides recommendations regarding a sampling visit, interim measures, a RFI or no further action at the facility. A bibliography of documents reviewed in preparing this report is given in Section 5.0. All the documents in Section 5.0 were reviewed in preparing this report, but not all contained information that needed to be cited as references in this report.

1.1 Permit History

An NPDES Permit (MI 0001902) was issued to Quanex Corp. - MST on September 5, 1985 (69,72). Violations of permit regulations regarding monthly average phosphate and total solid limits have been reported on several occasions, as detailed in Section 2.4 of this report (6, 13).

On August 5, 1983 a Consent Agreement and Final Order (CAFO) was issued to Quanex Corp-MST regarding cessation of hazardous waste (HW) treatment, storage or disposal except per 40 CFR Part 265. The CAFO also ordered that compliance with Consolidated Permit Regulations in accordance with 40 CFR Parts 124 and 270 should be maintained just as if timely submittal of a Notification of Hazardous Waste Activity and Part A Permit Application in 1980 had occurred (95). Quanex Corp. - MST then pursued an extension in submitting a Part B application due to the delisting of lime stabilized waste pickle liquor sludge from the hazardous waste list as of December 5, 1984 (85). Then on February 4, 1985 another CAFO was issued concerning a complaint of violations of Section 3008 of the Solid Waste Disposal Act as amended by RCRA 42 USC, Section 6928 and 40 CFR Part 22. The CAFO ordered Quanex Corp. - MST to achieve and maintain compliance with 40 CFR Part 265 and assessed a civil penalty (76).

1.2 Enforcement History

The Michigan Department of Natural Resources (MDNR) has conducted regulatory enforcement activities at this site. Based on file information and several site investigations, MDNR directed Quanex Corp-MST on October 28, 1986 to perform a remedial investigation (RI) of their sludge drying beds to determine the extent of soil and groundwater contamination (52). The resulting investigation and monitoring by Quanex Corp - MST showed that the sludge was not inert as Quanex Corp. - MST had previously assumed, because leachate extraction and testing found lead and manganese in excess of primary and secondary drinking water standards. Therefore, the sludge was subject to the requirements of Public Act 641 (Solid Waste Management Act) (44).

On September 24, 1987, MDNR approved the August 5, 1987 revised closure plan submittal by Quanx for surface impoundments and container storage areas (39). During November, 1988, Quanex Corp - MST expanded their wastewater treatment facility and discontinued discharge of sludge to the surface impoundments (18,28).

Quanex Corp - MST requested an extension of closure for the surface impoundments on November 2, 1988 and submitted a petition for Type III designation of the surface impoundment sludge in July, 1989 (8,18). Note that in Michigan, Type III wastes are wastes which have very low potential for ground water release whereas Type I wastes are characteristically hazardous and the definition of Type II wastes lies somewhere in between, as defined in Michigan Acts 64 (Hazardous Waste Management Act) and 641 (Solid Waste Management Act). An amended closure plan for the surface impoundments was submitted on August 27, 1989 (4). MDNR issued a Notice of Deficiency on November 15, 1989 regarding certification of the HW Container Storage Unit Closure and in February, 1990, MDNR accepted a revised closure certification and released Quanex Corp - MST from financial responsibilities regarding the closed unit (1, 117).

2.0 GENERAL DESCRIPTION OF FACILITY AND PROCESSES

Quanex Corp - MST manufactures seamless steel tubing from round steel bars. Hot and cold mill processes are used.

2.1 Facility Location and Operation

The Quanex Corp - MST Division is located on the southwest side of the City of South Lyon in Oakland County, Michigan. See Figures 1 and 2 for the county and facility locations, respectively. The site is bordered by Ten Mile Road on the north, McMunn Street on the east, the Grand Trunk Western Railroad right-of-way on the south and Dixboro Road on the west. The facility covers approximately 53 acres (75). Figure 3 shows a plan of the facility.

The facility manufactures seamless steel tubing by using hot and cold mill processes. During this process, round steel bars are heated, pierced and air cooled. After cooling, lubricants consisting of zinc phosphate and sodium stearate elements are applied prior to cold-drawing of the tubing to the required dimensions. If further size reduction becomes necessary, annealing, acid pickle liquor cleaning, hot and cold water rinsing, and drying are performed (8). Tubing

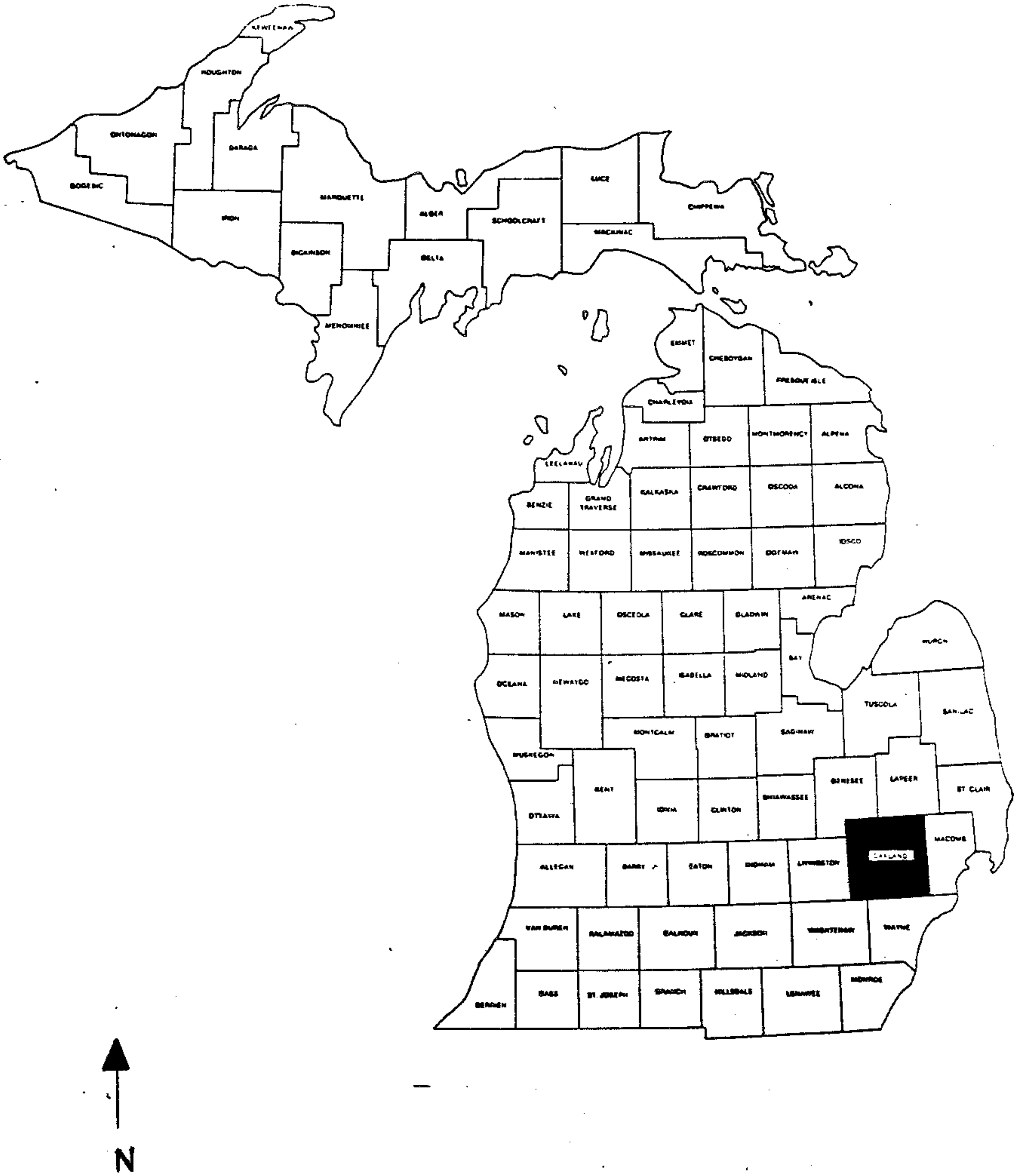

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FIGURE 1: Oakland County, Michigan

SCALE: NONE

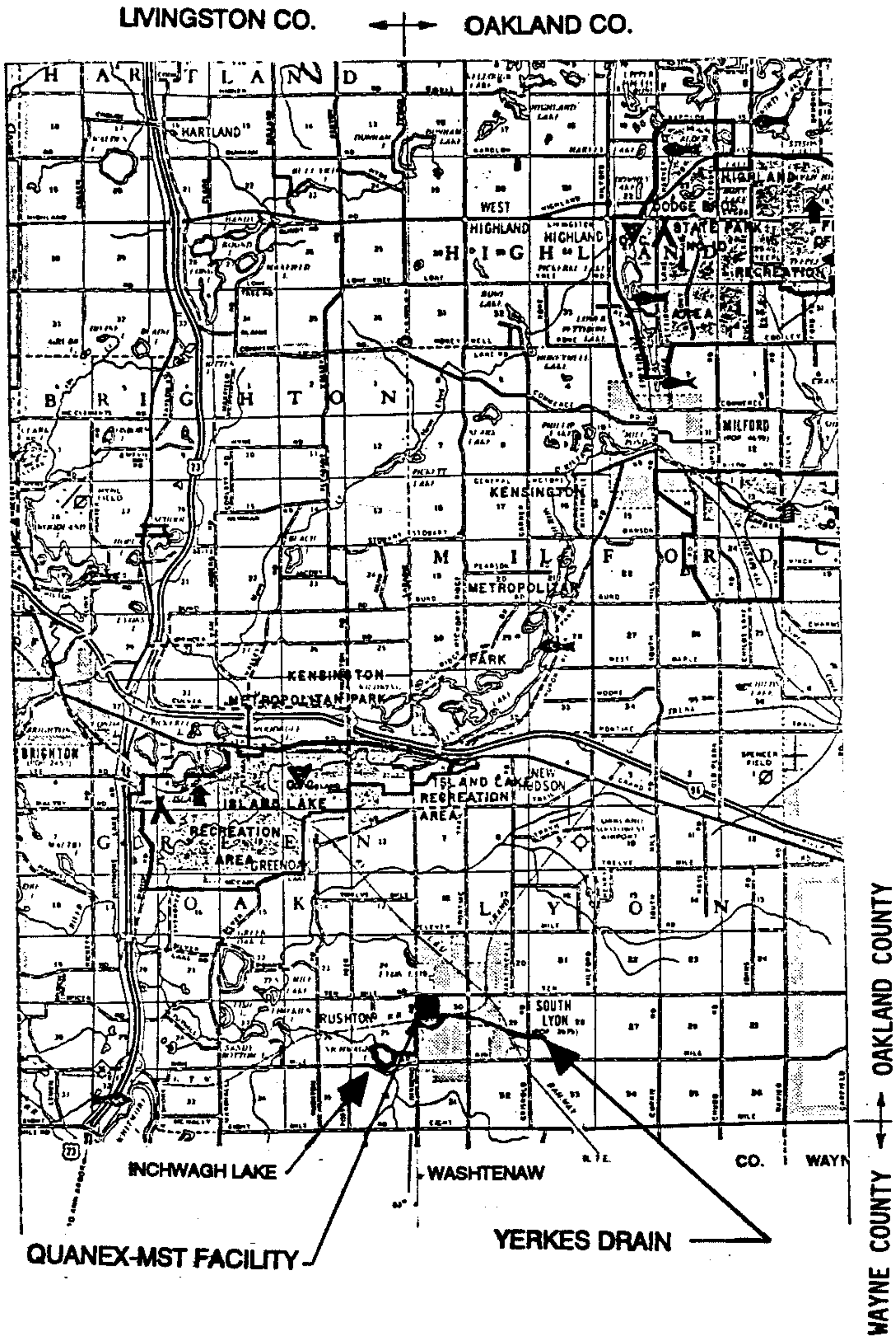

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FIGURE 2: Location of Quanex-MST Facility in Oakland County

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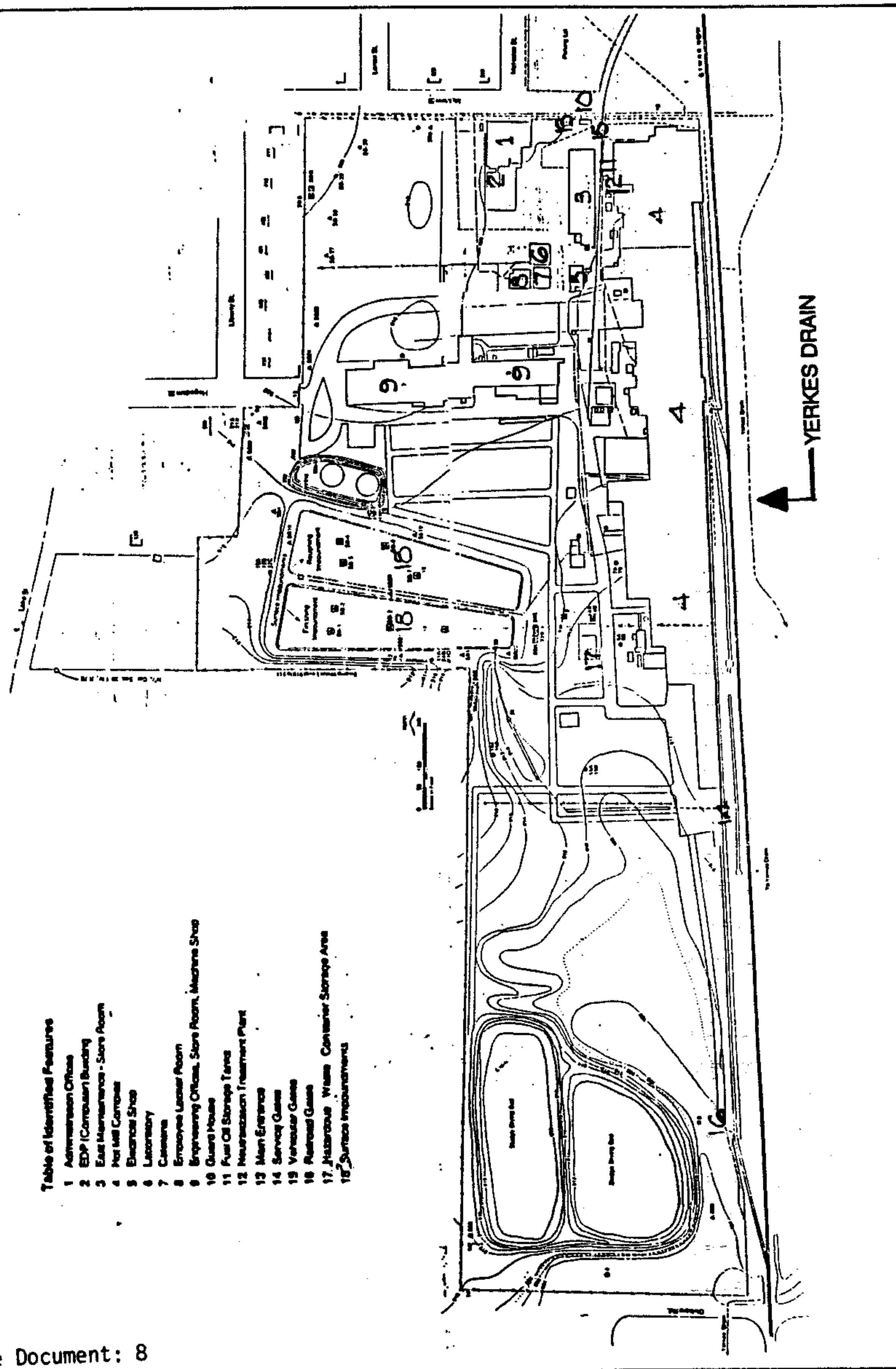

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FIGURE 3: Quanex MST Facility
Site Plan

SCALE: 1" = 314'

immersion in a cleaner/rust inhibitor is also possible. The processing operation produces approximately one million gallons of wastewater per day (59,75).

Hazardous and non-hazardous wastes generated by the processes include waste pickle liquor, acid cleaning rinsewater, machine lubricating oils, salt pot waste, steel and metal scrap and commercial product residues in liners and containers (75). Solvents used in the cleaning of manufactured products are temporarily stored, used and spent-wastes are drummed and temporarily stored before disposal (80).

Wastewater treatment at the plant includes metering of a lime slurry for flocculation and neutralization, aeration, and the settling and filter pressing of solid components (3,54). Treatment equipment includes two clarifiers, two polymer feed systems, pH adjustment system, sludge thickener tanks, sludge filter presses, air compressor and pumps, piping, instrumentation, etc. (17). The treated wastewater is discharged through a NPDES permitted outfall to Inchwagh Lake via Yerkes Drain. Prior to November, 1988, wastewater was discharged into two surface impoundments before release into Yerkes Drain (75). Settled solids from the impoundments were placed in two sludge drying beds from 1970 to 1987 (33). Sludge produced after the 1988 expansion of the wastewater treatment plant has been disposed of offsite in a licensed Type II landfill. A schematic of the manufacturing, pickling, waste disposal and treatment processes for the facility is shown in Figure 4.

2.2 Environmental Setting

Quanex Corp - MST is located immediately to the north of the Yerkes Drain. Some swampy areas are present along the north and western edges of the site. Inchwagh Lake and its surrounding wetlands are located one-half mile southwest of the site as shown in Figure 2. Residential properties are located to the northeast, east and southeast (75). Two municipal wells are located ¼ mile east-southeast of the facility (60).

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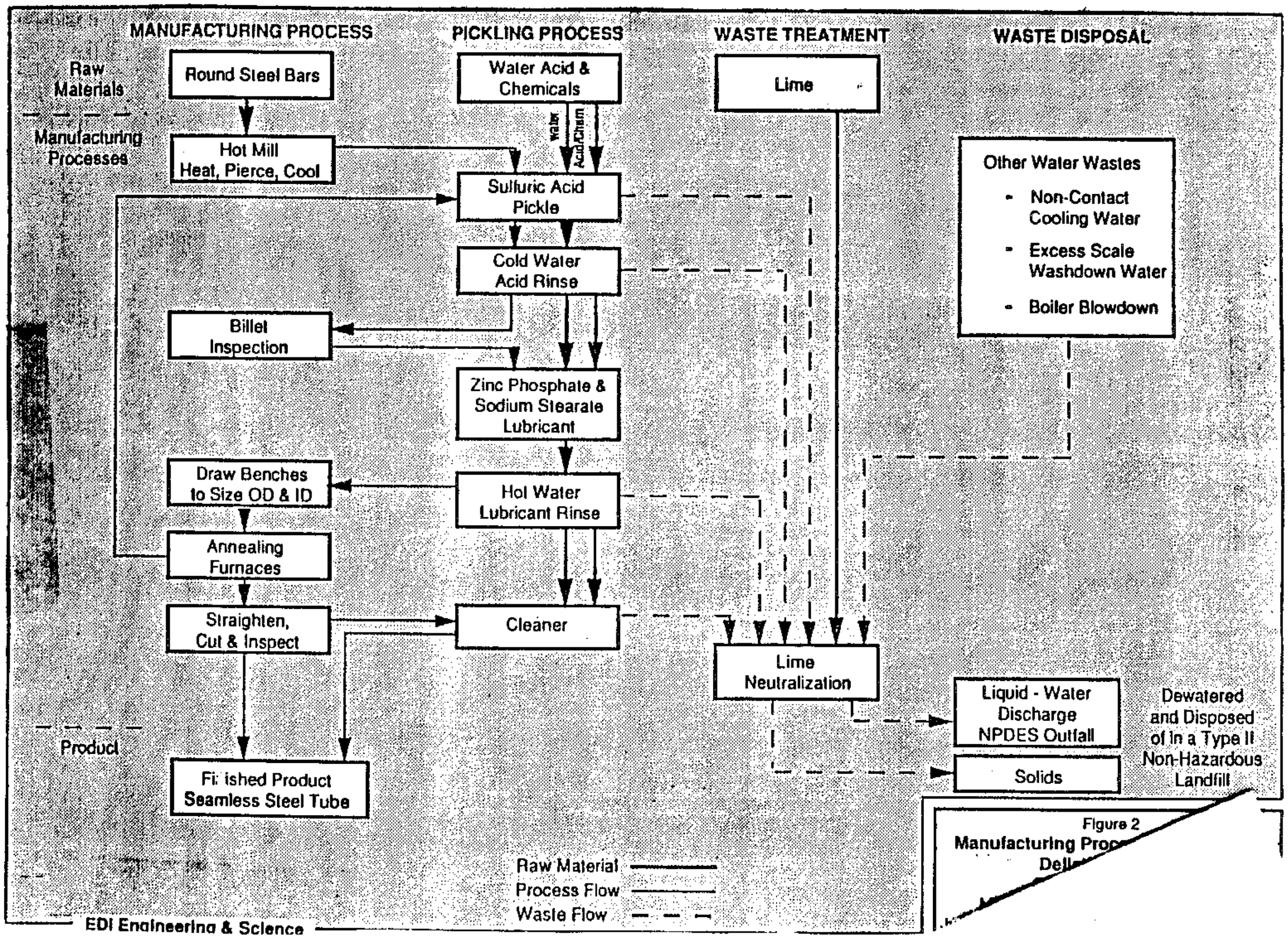

FIGURE 4
SCHEMATIC OF PROCESSES

SCALE: NONE

2.2.1 Geology

In the South Lyon region, 300 to 400 feet of glacial drift overlies the Mississippian Coldwater Shale. Quanex Corp - MST is in an interlobate area, northwest of the Erie glacial lobe. In the north-northeast part of the site, 15-30 feet of outwash sand and gravel deposits rest on interbedded silt, sand and clay. In the southeast part of the site, only outwash deposits are found and are approximately 70 feet deep (22). The glacial drift is dominantly outwash, moraine deposits and other ice contact deposits including interbedded clays, sandy clays, or sand and gravel. The land surface generally slopes to the southwest from an elevation of 1000 feet approximately two miles northeast of the facility to elevation 887 feet, which is the surface of Inchwagh Lake. The estimated elevation of bedrock is 650 feet (60). Surface grade of the Quanex Corp -MST facility ranges approximately from elevation 910 feet to 920 feet (66).

2.2.2 Hydrogeology

Groundwater monitoring and well logs have indicated vertical and horizontal gradients through the outwash aquifer underlying the site. Groundwater elevations taken prior to closure have shown mounding of the water table under the two surface impoundments (22, 60). However, the present existence of such a mound is uncertain since the surface impoundments have not contained discharge waters since November, 1988 (18). The dissipation in elevation of the mound toward Yerkes Drain to the southeast was greater than the dissipation in elevation of the mound to the northwest because the outwash underlying the site to the north rests upon interbedded silts, clays and sands relatively close to grade. A groundwater hydraulic conductivity at this site, ranging from 0.000011 to 0.0094 cm/sec, has been found using monitoring wells as reported by Quanex Corp's consultant in the 1987 Annual Groundwater Monitoring Report (22). Groundwater flow velocity through the outwash aquifer away from this mound was estimated in the report to be 0.00075 ft/day and projected to possibly achieve an expected maximum of 0.22

ft/day (32). An MDNR estimate of 4.5 ft/day for a groundwater flow immediately adjacent to the mound was developed, based upon a vertical gradient caused by the previous head of water in the impoundments (22).

2.2.3 Climate/Meteorology

Climate information available from the U.S. Department of Agriculture Soil Conservation Service indicates that an average annual windspeed of 11.4 miles per hour from the prevailing southwesterly direction occurs in this general region. The average annual temperature is approximately 59° F and average yearly total precipitation is approximately 30 inches.

2.3 Pollutant Releases into Ground Water

On March 9, 1974, a Michigan Water Resources Commission investigation revealed an accumulation of oil in the Yerkes Drain and in the wetlands in the southwest corner of the Quanex Corp - MST facility. It was then determined that an old fuel line had ruptured, releasing an unknown volume of fuel oil to the surface of the groundwater table and into Yerkes Drain (36, 79). The release volume has been estimated to be anywhere from 200,000-300,000 gallons, at 420,000 gallons, and from 400,000 to 500,000 gallons (36,57,75). Figure 5 shows the area affected by the release. On December 14, 1988, debris was discovered in the berm dividing the two surface impoundments during sludge solidification activities (9,16). Sampling and testing by a consultant of Quanex Corp. - MST revealed the presence of no contaminants in the one ground water sample taken which was analyzed for total metals and volatile organic scans 601 and 602. Analysis of six berm soil samples, three samples of solidified sludge and two soil samples from the finishing lagoon berm did find scattered levels of lead, chromium, toluene and 1,1,1 trichloroethane when tested for total metals and volatile organic scans 601 and 602 (See Appendix A). The presence of low ppb ranges of arsenic and 1,1-dichloroethane have been indicated by test results from monitoring wells near the western surface

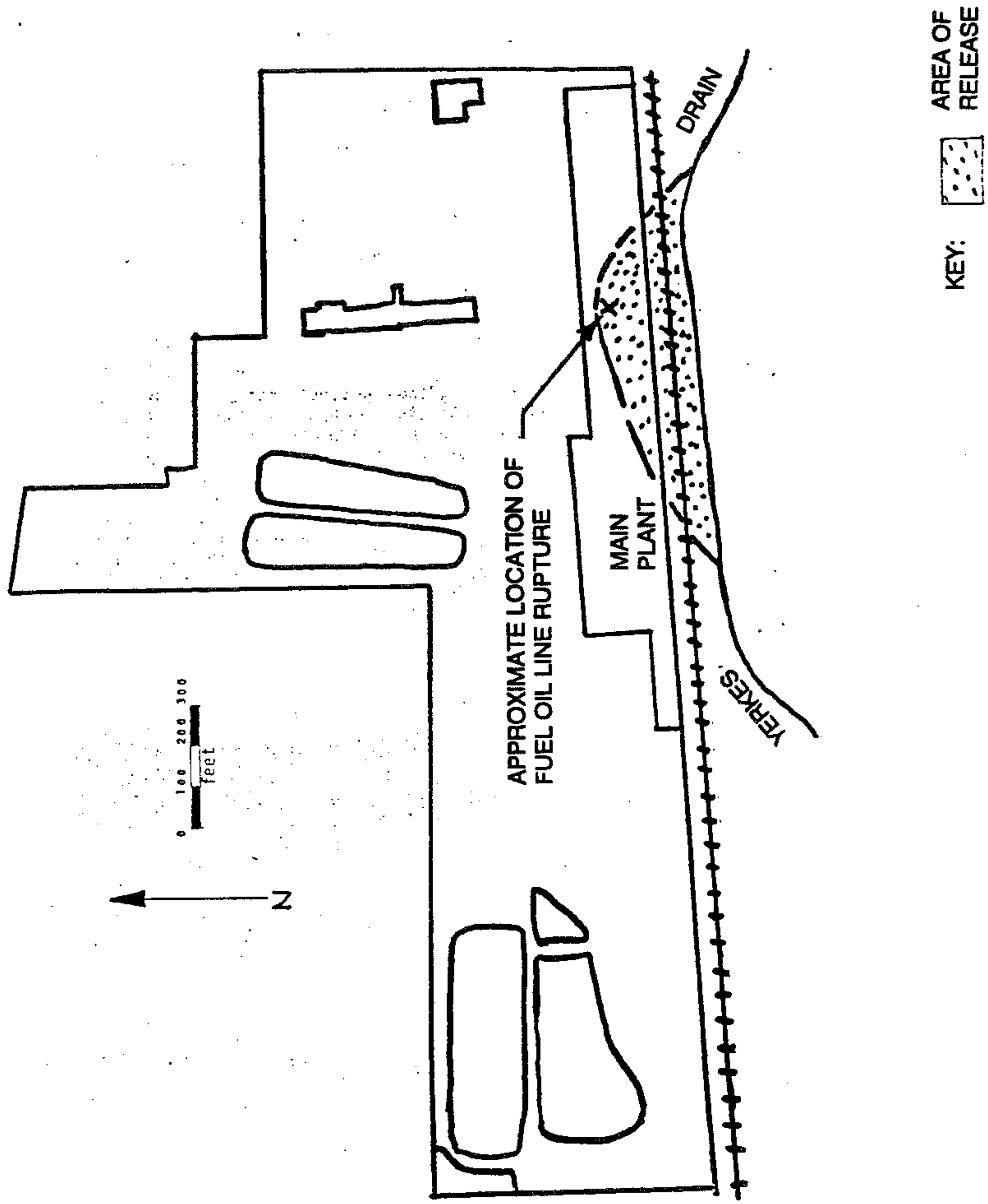

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FIGURE 5: Quanex MST Fuel Oil Area Plan

SCALE: NONE				Page 12

impoundments, neutralization treatment plant and downgradient of the fuel oil release area.

2.3.1 Release Potential

The fuel oil line has been disconnected from the present oil storage system so no further releases beyond that which is already present should occur (79). Cleanup and disposal activities for the debris located in the berm between the surface impoundments are awaiting MDNR approval of either a work plan or an amended closure plan. Releases of low levels of arsenic and 1,1 - dichloroethane should continue.

2.3.2 Monitoring Data

Initial remediation for the fuel oil release included placing a system of well points, pumping and disposal of the oil/water emulsion, and establishing monitoring wells to identify the affected area. The present groundwater monitoring system for the fuel oil release consists of monitoring wells and release control and fuel oil collection equipment. A remedial action plan was approved by MDNR and the Michigan Water Resources Commission (MWRC) for implementation of this monitoring and removal (75). Bi-annual reporting of fuel oil recovery since the release occurred has been performed and, as of December 30, 1987, approximately 290,000 gallons of fuel oil had been recovered. At that reporting, 10 gallons had been recovered over the preceding six months (35,57,79). Further action or remediation regarding the fuel oil beyond what has already been done was not documented in file information. Well points and soil and sludge samples were used to monitor the debris contaminant location in the surface impoundment berm and no contamination was found in one groundwater sample (16). Groundwater monitoring at the site for interim status and in accordance with the Groundwater Quality Assessment Program has indicated the presence of arsenic (3.7 - 9.2 ppb), copper (10-30 ppb), selenium (2.9 ppb), 1,1-dichloroethane (1.2 -5.3 ppb), iron and sulfate (32,47,60).

Consultants to Quanex Corp. -MST have attributed the presence of arsenic, iron and sulfate to natural or offsite sources and 1,1-dichloroethane to well contamination (32, 46). In a 1988 Comprehensive Monitoring Evaluation (CME) performed by MDNR, the impact of the surface impoundments on groundwater quality was reported to be minor although parameters in question, namely arsenic and 1,1 - dichloroethane, were present (22). Monitoring wells 3, 14A and 14B were covered during construction of the neutralization treatment plant and monitoring of wells 6A,6B,16A and 16B began in their stead. See Figure 6 for site monitoring well locations and Appendix E for a compilation of testing data from the sources indicated.

2.3.3 Potential Receptors

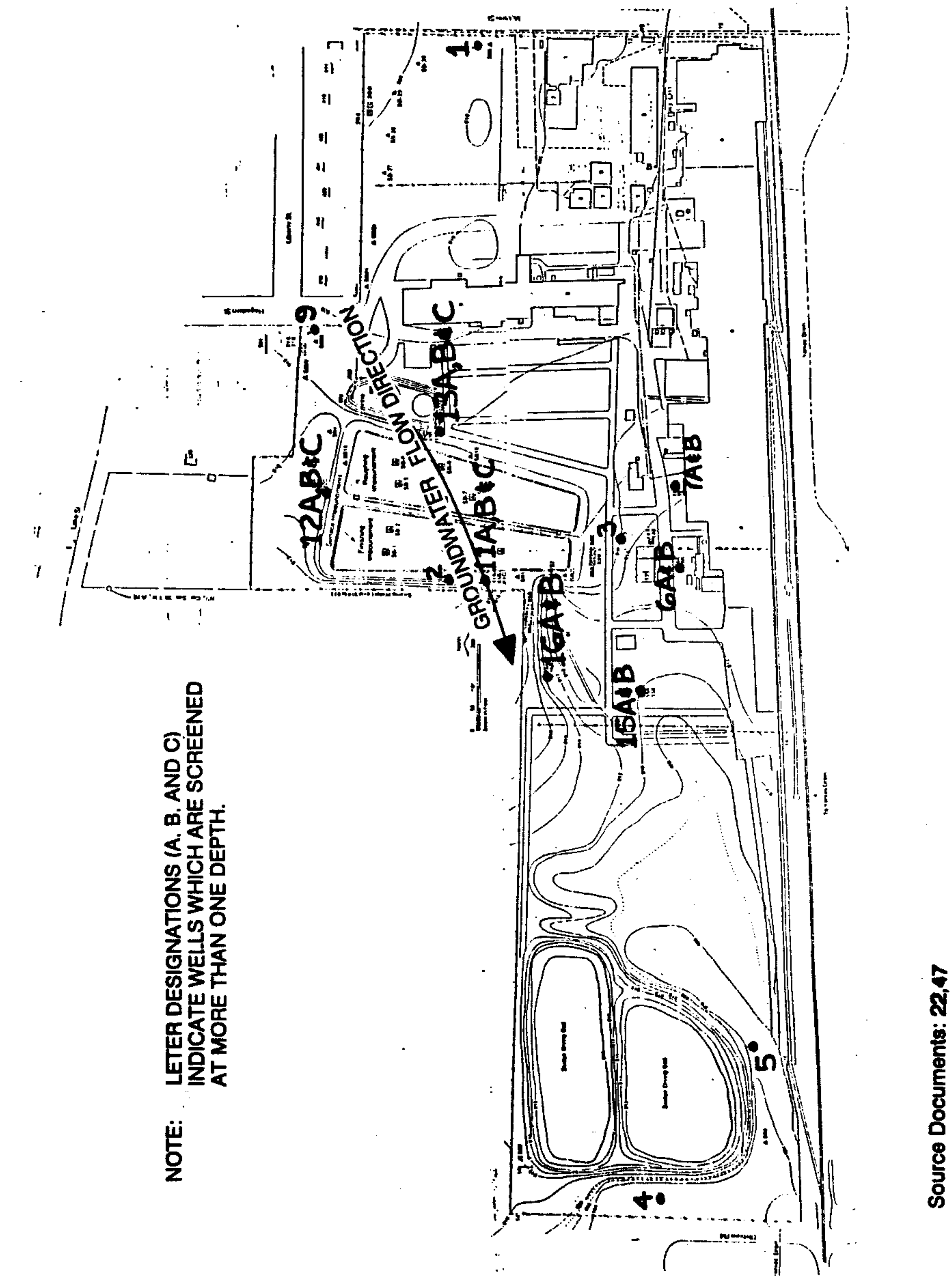
Yerkes Drain and Inchwagh Lake are potential receptors. Two municipal wells are located 1/4 mile east-southeast of the facility, on the opposite side and upgradient of Yerkes Drain, and are therefore not a potential receptor.

2.4 Potential Releases into Surface Water

An oily film noticed in Yerkes Drain in early 1974 led to the discovery of a broken fuel line and a fuel oil release (36, 79). Quanex Corp - MST discharges treated process water into Yerkes Drain per NPDES permit. Several violations of this permit, including exceeding of limits set for suspended solids and total phosphorus, occurred from December 1988 through June 1989 (6,13). On August 22, 1989 a Notice of Noncompliance was issued by MDNR Water Resources Commission advising Quanex Corp - MST to return to compliance or face regulatory action (6).

2.4.1 Release Potential

The fuel oil line has been disconnected from the distribution header connected to the present supply system, release controls have been installed and continued potential for release to the control locations remains. The potential for release beyond the release location to



NOTE: LETER DESIGNATIONS (A. B. AND C) INDICATE WELLS WHICH ARE SCREENED AT MORE THAN ONE DEPTH.

Source Documents: 22,47

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FIGURE 6: Ground Water Monitoring Well Locations

SCALE: NONE

Yerkes Drain is low because passive collection and control measures are present. Also, any release beyond this point would be limited by floating, oil-skimming filters present in Yerkes Drain. NPDES Permit violations occurred after conversion from the use of large surface impoundments to using smaller volume clarifiers in the wastewater treatment process during November, 1988 (3). Quanex Corp. - MST reported that reduction in wastewater volume discharge with no reduction in process solids and phosphorus caused exceedence of permit limitations. A limitation of 20 mg/L and 110 lbs/day as monthly averages for total suspended solids was exceeded by 19 to 21 mg/L and 183 to 232 lbs/day for four months, and a monthly average limitation of 0.25 mg/L for total phosphorus was exceeded for six months by 0.02 to 0.16 mg/L (6). The conversion to clarifiers was also reported to affect monitoring and the ability to compensate for problems before discharge (3). The potential for further releases from this source exists and therefore, it is closely monitored, regulated and reported.

2.4.2 Monitoring Data

Daily samples are taken from the effluent and sent to the City of South Lyon Wastewater Treatment Plant (WWTP) for analysis. Results are recorded on bench sheets. Continuous-reading 24 hour strip charts are used to record pH. Records are available for the previous five years (10). Reporting of non-compliance events and submittal of Discharge Monitoring Reports are required in order to assure regulations are followed (3,6). Release control, collection and well monitoring for fuel oil are in place and small volumes of fuel oil, roughly 5 to 15 gallons, are typically collected during six month periods (35, 79). Monitoring well testing has found the fuel oil to be a high grade # 1,2 or 3 fuel oil (57).

2.4.3 Potential Receptors

Aquatic biota of Yerkes Drain and Inchwagh Lake are potential receptors.

2.5 Pollutant Releases into Air

Activity Reports from MDNR Air Quality Division (AQD) and VSI information indicate the following equipment is kept on their Emissions Inventory (EI): One packed tower acid mist scrubber for No.2 Pickle House; six acid pickle tanks, four with fan - drawn ventilation and two sharing two wet scrubbers; six roller hearth annealing furnaces; one lime silo with baghouse; two natural gas/oil boilers and rotary and walking beam reheat furnaces which share one stack (91,94,98,101,105,107-110). No releases from these sources have been reported. A complaint was received on August 10, 1987 by a local resident regarding a woodburning/chemical odor but no findings resulted when checked by MDNR-AQD on August 24, 1987 (41).

2.5.1 Release Potential

No reports of releases were present in the files or VSI information. Processes are presently operated with control equipment. Releases could occur if control equipment malfunctions.

2.5.2 Monitoring Data

Visual (opacity) only as required.

2.5.3 Potential Receptors

Due to the upwind location of Quanex Corp.- MST with respect to the City of South Lyon and given that it borders on residential areas, the people of South Lyon would be potential receptors.

2.6 Pollutant Releases into Soils

There have been six potential areas of pollutant release into soils reported. In late 1973 or early 1974 a buried fuel oil line ruptured, leaking fuel oil into the soil as described in Section 2.3 (36). Waste barium and corrosive solids within a hazardous waste storage pad (Area B) may have seeped into the underlying soil (43). Lead and manganese may have entered the soil surrounding two sludge drying beds (44). Two surface impoundments previously used to collect sludge waste contain a variety of metals which may enter the underlying soil (8). Three waste pickle liquor acid pits which operated for 34 years were closed without formal cleanup (62). Berm debris uncovered December 14, 1988 between the two surface impoundments may have leaked small amounts of toluene, lead, chromium and 1,1,1 trichloroethane as described in Section 2.3 (9,16).

2.6.1 Release Potential

The buried fuel line has been disconnected from the supply system but has not been removed. The line/release area is a source of release of approximately 5-10 gallons per six month period, but releases are contained by "primary" and "secondary" control measures. Release potential to and beyond Yerkes Drain appears to be low. The hazardous waste storage pad has been acceptably closed per MDNR and closure activities determined that no releases had occurred, so no release potential remains (117). Two sludge drying beds and two surface impoundments are in various stages of delisting, disposal or closure. Sludge sample test data prepared by consultants to Quanex Corp. - MST appears to show waste constituents for the lime stabilized waste pickle liquor sludge (LSWPLS) in the beds and impoundments to be immobile and, based on that, release potential is limited (8, 33). Three waste pickle liquor acid pits were closed prior to 1968 before RCRA regulations were established, and potential for release is uncertain since these areas have been built over during plant expansions and closure/cleanup is not documented. The berm debris is still in place, awaiting MDNR approval for disposal, and release potential remains.

2.6.2 Monitoring Data

Berm soil and dried sludge samples taken from the site by consultants to Quanex Corp. - MST indicate elevated levels of lead (0.1 - 3.6

mg/L), toluene (0.039 - 0.14 mg/kg), chromium (0.07 - 0.08 mg/L) and 1,1,1 trichloroethane (0.083 - 0.12 mg/kg) in certain locations (See Appendix A). Leachate testing of the impoundment and drying bed sludges has found no constituents in excess of E.P. Toxicity limits (8, 33). Drying bed sludge leachate samples have been found to exceed drinking water standard limits for manganese (0.04 to 1 mg/L detected) and for lead (0.11 to 0.47 mg/L detected) (44). Barium (1.1 mg/L), zinc (5.5 - 5.9 mg/L) and selenium (0.013 - 0.019 mg/L) at levels in excess of drinking water standards have been found in the impoundment sludge leachate, but are less than twice the allowable standard levels (8). See Appendix B for sample results for sludge and leachate constituent levels. Note that all test data recorded in the files was related to E.P. Toxicity testing, that no testing according to new TCLP procedures was evident, and that a sample could be non-hazardous under E.P. TOX criteria but fail to meet TCLP criteria.

2.6.3 Potential Receptors

Surface water, ground water and terrestrial biota in or on the soil are potential receptors.

2.7 Gaseous Pollutants into Subsurface Soils

No sources are known.

2.7.1 Release Potential

Volatilization of organic contaminants, if present, could cause potential for release.

2.7.2 Monitoring Data

No data is available.

2.7.3 Potential Receptors

Ambient air is a potential receptor if subsurface gases migrate to the surface and are released from the soil.

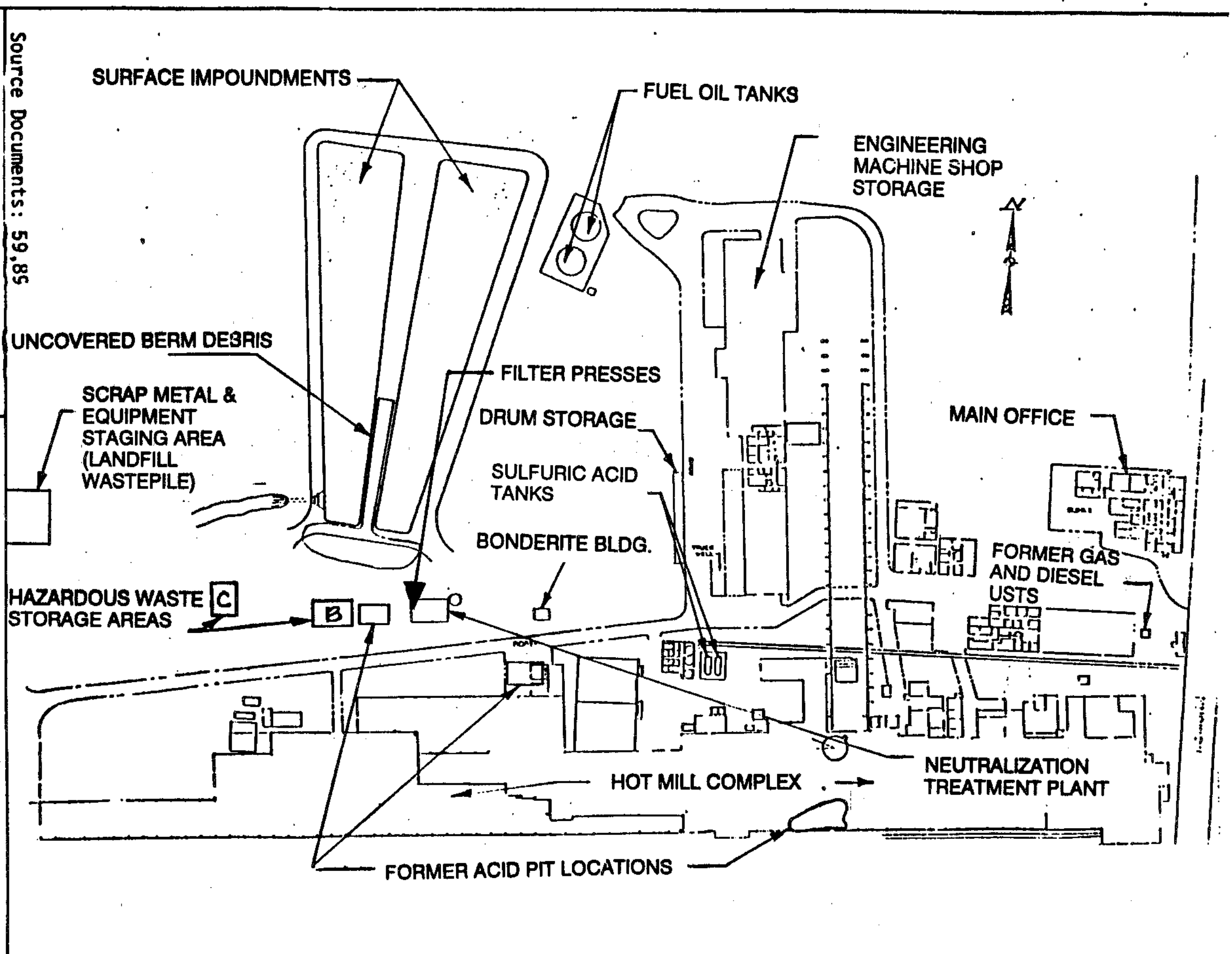
3.0 DESCRIPTION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

Ten SWMU's are identified at the Quanex Corp-MST site. These include surface impoundments, sludge drying beds, former acid pits, landfill/ wastepile, uncovered berm debris, two hazardous waste container storage facilities, a fuel oil release area, two filter presses and a neutralization plant. See Figures 3,5 and 7 for locations of the SWMUs and plant process areas.

3.1 Unit Type: Surface Impoundments

Regulatory status: SWMU. This area is inactive and undergoing closure (See Figure 7). A revised closure plan was conditionally approved September 24, 1987 (39). However, discovery of debris in the berm between the two impoundments, designation of the sludge as Type II waste by MDNR, and the submittal of a new closure plan for performing closure with sludge in place have left this issue awaiting MDNR consideration and approval/disapproval (4,9,12).

A. Unit Description: The two surface impoundments are each 550 feet long and tapered from 125 feet to 50 feet end to end. The total depth of the impoundments was uncertain due to previous dredging of sludge into the sludge drying beds, but sludge depth in the finishing (western) lagoon was estimated during the VSI at 3 feet and estimated at being anywhere from 7 to 14 feet in the roughing (eastern) lagoon. The impoundments were used to collect sludge from the settling of lime-treated wastewater flocculants and for retention of the liquid effluent prior to discharge via the NPDES permit. See Appendix C Photographs 6 and 7 for surface impoundments.



Source Documents: 59,85

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FIGURE 7: Locations of SWMUs and Process Areas

SCALE: NONE

B. Period of Operation: 1970 - 1988

C. Waste Type: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation. According to a July, 1989 Type III Designation Petition by Quanex Corp. - MST for the surface impoundment sludge, LSWPLS was included in U.S. EPA's first list of hazardous wastes. It was also reported that in 1980, K063 materials were deleted from the list but U. S. EPA continued regulation under the "derived from" rule, 40 CFR 261.3(c)(2). The petition concluded by stating that K063 materials were fully exempted from the presumption of hazardousness effective December 5, 1984 based upon leachate testing and site specific delisting petitions (8).

Waste Volume/Capacity: 46,900 Cubic Yards (CY) after stabilization with flyash (estimated).

Waste Constituents: LSWPLS contains constituents which would make it a hazardous material if present above acceptable concentrations. According to a July, 1989 Type III Designation Petition for the surface impoundment sludge, hexavalent chromium and lead are present in immobile forms with leachate test values well below maximum permissible E.P. TOX limits (8, Appendix B). Other possible waste constituents; including cadmium, copper, nickel, silver and zinc, are detectable in E.P. Toxicity leachate but are also below the lower limit for E.P. Toxicity hazardous classification. Classification in terms of TCLP testing is unknown.

D. Release Controls: Impoundments have release gates for liquids but do not have clay liners. Sludge has been stabilized with flyash.

E. Release History: No releases have been reported. Clarified free liquid has been discharged per NPDES permit. Normal operations occurred where sludge was removed by dredging from 1971 to 1975 and by pumping from 1975 to 1987 and placed in sludge drying beds on-site. Potential of releases to groundwater exists and is monitored (See Appendix E).

F. Conclusions: Sludge disposal or in-place closure is awaiting MDNR response to a Type III Designation Petition and a closure plan (4, 8). Delays on the designation petition determination may be due to the present lack and current development of definite constituent levels and limits for classification of Type III wastes by MDNR.

G. Observations: Impoundments do not have clay liners.

H. Sample Results: VOC testing for scans 601 and 602 found toluene at 0.09 and 0.14 mg/kg in two of three sludge samples taken. See Appendix A. Cadmium, copper, lead, nickel, silver and zinc are detectable in E. P. Toxicity leachate at less than hazardous levels. See Appendix B. Also, groundwater test data from adjacent monitoring wells is presented in Appendix E.

3.2 Unit Type: Sludge Drying Beds

Regulatory status: SWMU. This area is inactive. The sludge was delisted from the proposed K063 hazardous waste designation by the U.S. EPA in 1984, as described in Section 3.1 (8). Quanex Corp. - MST attempted to prove in 1987 that the sludge in the drying beds is an inert waste, but levels of manganese and lead were found to exceed the drinking water standards (44). Nonetheless, Quanex Corp MST submitted a Type III Designation Petition on January 29, 1988 for site-specific MDNR consideration prior to conducting disposal activities (11, 33). See Figure 3 for location of drying beds.

A. Unit Description: This area was used to dewater sludge transferred from two surface impoundments. The northern bed is approximately 500 feet long (east to west) by 160 feet wide (north to south) with a sludge depth of about 9-14 feet. The southern bed is approximately 325 feet long (east to west) and 225 feet long (north to south) with a sludge depth of about 7-10 feet (50). See Appendix C Photographs 25 and 26 for sludge drying beds.

B. Period of Operation: 1970 - 1987

C. Waste Type: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation. According to a January, 1988 Type III Designation Petition by Quanex Corp. - MST for the drying beds, an industry-wide delisting of K063 materials by the U.S. EPA occurred June 5, 1984, to be effective December 5, 1984. According to the petition, the delisting came about due to data presented by the American Iron and Steel Institute (AISI) and site-specific delisting petitions (53).

Waste Volume/Capacity: Approximately 80,000 CY

Waste Constituents: LSWPLS contains constituents which would make it a hazardous material if present above acceptable concentrations. According to a January, 1988 Type III Designation Petition for the drying bed sludge, hexavalent chromium and lead are present in immobile forms with leachate test values well below maximum permissible E.P. TOX limits (33, Appendix B). Other possible waste constituents; including barium, cadmium, copper, manganese, nickel, silver and zinc, are detectable in E.P. Toxicity leachate but are also below the lower limit for E.P. Toxicity hazardous classification. Classification in terms of TCLP testing is unknown.

D. Release Controls: Groundwater monitoring wells are located to the south and west. Sludge has not been stabilized with flyash.

E. Release History: None known. Groundwater monitoring results show presence of contaminants attributed as background (See Appendix E).

F. Conclusions: Further action is contingent upon MDNR response to the Type III delisting petition. Release potential appears low.

G. Observations: Beds have berms but not clay liners.

H. Sample Results: Barium, cadmium, copper, lead, manganese, nickel, silver and zinc are detectable in E.P. Toxicity leachate at less than hazardous levels. See Appendix B. Also, groundwater test results from adjacent monitoring wells are provided in Appendix E.

3.3 Unit Type: Former Acid Pits

Regulatory status: SWMU. These areas are inactive and underwent closure prior to existence of formal closure regulations. In an April, 1986 Loss of Interim Status Inspection Report - Checklist, prepared by a consultant to the U.S. EPA, these areas were given a status described as having completed closure in a manner acceptable to the responsible agency and in accordance with the closure plan. Closure of the units at that time was reported to the MDNR and U.S. EPA (59). As shown in Figure 7, these pits have been covered over during plant expansion activities.

A. Unit Description: The three pits were approximately 80 feet by 80 feet by 6 feet deep and contained waste pickle liquor sludge which may have been treated by lime (64).

B. Period of Operation: Approximately 1935 to 1969

C. Waste Type: Lime stabilized waste pickle liquor sludge (LSWPLS).

Waste Capacity/Volume: Approximately 1400 CY

Waste Constituents: LSWPLS sample test data not available. More-recently produced LSWPLS in the drying beds and impoundments contain a variety of metals, see sections 3.1C and 3.2C of this report.

D. Release Controls: Groundwater monitoring has been performed and contaminants detected in levels considered by the facility to be background. See Part H below and Appendix E.

E. Release History: None known.

F. Conclusions: Exact pit locations are uncertain and two of the pits appear to have been built over during plant expansions. The files and VSI did not reveal whether soil sampling and groundwater monitoring had been performed specifically for the pits. Nearby monitoring has shown no conclusive evidence of contamination. See Appendix E.

G. Observations: Detecting the lack or presence of hazardous levels of LSWPLS constituents in the former pit areas might be a good indication of potential for long-term releases from the impoundment and drying bed sludges, since the use and closure of the pits occurred long ago (1935-1969).

H. Sample Results: Data from monitoring wells 3, 14A and 14B near two of the former pit locations, as reported in a 1986 Groundwater Quality Assessment Program (GQAP), has indicated little variability between parameters measured for suitability as a drinking water supply and in terms of

VOC's and totals for metals found in upgradient well 1 (60, Figure 6, Appendix E). Parameters detected during assessment monitoring include sodium, barium, chromium, fluoride, chloride, manganese, and phenols in reportedly acceptable levels per 40 CFR 265 Appendix III; iron, arsenic and sulfate in slightly higher quantities, and methylene chloride in very high quantities (32, 60). All of these items of concern have been explained in the Quanex GQAP report as: background levels, due to unfiltered samples, typical in near surface groundwater or due to error in analytical technique (47,60). Other chemical analyses and suitability testing per drinking water standards are given in the GQAP report and show no large discrepancy from the other data (See Appendix E). From a regulatory approval aspect, the U.S. EPA approved the April, 1986 GQAP based on inclusion of inserts from July, 1986 and replacing of a single page per direction of William Muno, EPA, in September, 1986 (47). The files did not contain this additional information.

3.4 Unit Type: Uncovered Berm Debris

Regulatory status: SWMU. Scrap metal and drum remnant debris was discovered during sludge solidification for closure of the two surface impoundments. Removal and disposal of the material is awaiting a response to either a March 24, 1989 work plan submitted to MDNR or an amended closure plan for the surface impoundments submitted in August 1989 to MDNR (4,9).

A. Unit Description: The debris is located in the berm and southern end of the two surface impoundments (See Figure 7). Origin is unknown and presumed to be historic dumping from a staging area for scrap metal. See Appendix C Photographs 9 and 10 for berm debris.

B. Period of Operation: Unknown

C. Waste Type: Solid wastes including steel scrap and drum remnants.

Waste Volume/Capacity: Unknown; preliminary debris area is 180 feet long and berm is approximately 20 feet wide (14).

Waste Constituents: Toluene; 1,1,1 trichloroethane; chromium, and lead have been detected in berm soil samples tested for VOC's and trace and total metals (9).

D. Release Controls: Groundwater monitoring wells are located nearby (See Figure 6 and Appendix A).

E. Release History: Unknown. Due to nearby location of the scrap metal and retired equipment dismantling area, it is speculated that some of this material was used during construction of the berms for the surface impoundments.

F. Conclusions: The debris is anticipated by Quanex Corp. - MST to be disposed of as a Type II waste upon MDNR approval of a March 24, 1989 work plan. Additional sampling during excavation and disposal is proposed (9).

G. Observations: Scrap metal debris was observed on the berm surface.

H. Sample Results: Discovery of the debris lead to taking of eight berm soil samples, three stabilized impoundment-sludge samples, and one groundwater sample on December 20, 1988. All samples were tested for volatile organic scans 601 and 602 and for trace and total metals (9). Toluene, 1,1,1 -trichloroethane, chromium and lead were found in the soil and dried sludge samples. Groundwater testing found nothing. Contaminant levels did not exceed E.P. Toxicity allowable levels (9). See Appendix A.

3.5 Unit Type: Hazardous Waste Storage Facility B

Regulatory status: SWMU. This facility stored barium and corrosive materials on a concrete pad (43). The facility has been removed and clean closed. Closure certification was accepted when MDNR released Quanex Corp-MST from financial responsibilities regarding the closed unit (1,117).

A. Unit Description: Area B was a fenced-in drum storage pad, 40 feet by 40 feet. See Figure 8 and Appendix C Photograph 11 for the former location of the pad.

B. Period of Operation: 1984-1989.

C. Waste Type: Hazardous spent materials.

Waste Volume/Capacity: Approximately 110 gallons of barium and 2 CY of corrosive materials.

Waste Constituents: Waste barium (D005) and corrosive solids (D002).

D. Release Controls: The Area B pad has been removed and clean closed per MDNR release of Quanex Corp - MST from financial responsibilities regarding the closed unit.

E. Release History: None reported.

F. Conclusions: Area B has been removed and clean closed, no further action is necessary.

G. Observations: Area B is currently a clean gravel lot next to a fenced empty drum storage area.

H. Sample Results: No sampling results were found in the files. Revision 1 of the closure plan, dated August 5, 1987, indicated that soil below the pad would be removed

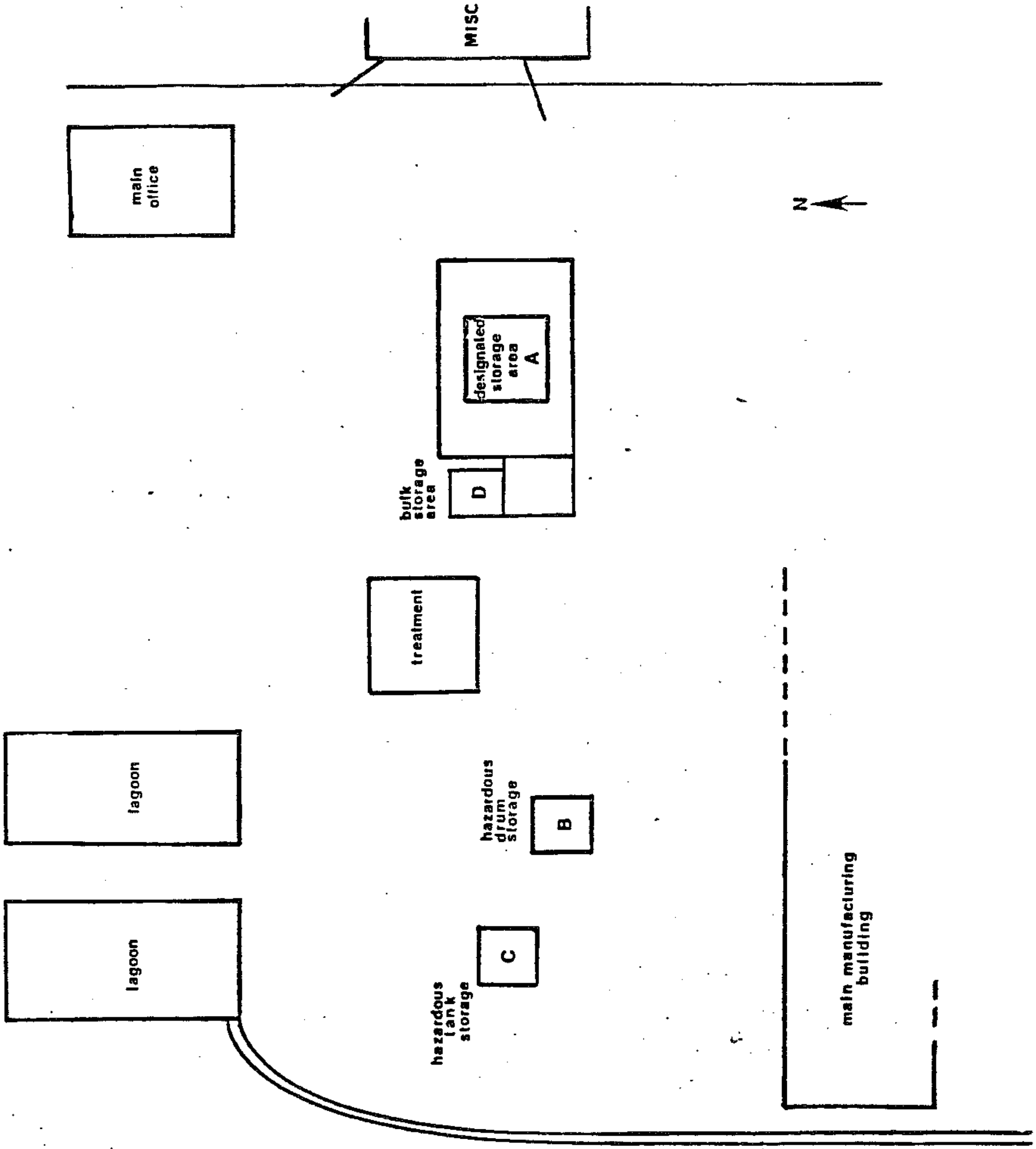

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FIGURE 8: General Layout of Hazardous Materials Storage Areas B&C

SCALE: NONE

if barium above background levels was found (43). A November, 1989 MDNR letter reviewing Quanex Corp.- MST's October, 1989 closure certification did comment on completed testing for background levels of barium (1). It was reported by Quanex Corp. - MST during the VSI that no evidence of releases was found.

3.6 Unit Type: Hazardous Waste Storage Facility C and Sump

Regulatory status: SWMU. Area C is active and is used for the temporary storage of waste oil and drum solvents for less than 90 days (64,80).

A. Unit Description: Area C is a spent-oil and solvent drum/tank storage pad including a 10,000 gallon aboveground tank for waste oils and an area for spent-solvent drums. This area also has a surfacewater runoff collection system and sump. See Figure 8 and Appendix C Photographs 13 and 14 for Area C location and details.

B. Period of Operation: 1979 - Present

C. Waste Type: Waste oil and spent solvents.

Waste Volume/Capacity: 10,000 gallons of waste oil and approximately 35 drums.

Waste Constituents: Spent petroleum products and solvents.

D. Release Controls: Area C is diked for 150% containment and has a sump for runoff and spill collection.

E. Release History: None reported.

F. Conclusions: Area C is active for waste storage for less than 90 days. No releases have been reported and potential spills are likely to be contained. However, according to a November, 1981 closure plan, this area was not originally diked (92). Therefore, sampling and testing to verify that no releases occurred prior to construction of containment is recommended.

G. Observations: Approximately 35 drums were in Area C during the VSI. The amount, level, etc. of waste in the drums and the 10,000 gallon tank is uncertain. Area C has a capacity of more than 35 drums but a total capacity figure has not been documented.

H. Sample Results: Sampling and testing have not been performed for Area C.

3.7 Unit Type: Fuel Oil Release Area

Regulatory status: SWMU. Inactive area of previous fuel oil spillage. Discovery of fuel oil in Yerkes Drain in 1974 was traced to a ruptured line beneath the Quanex mill building. The ruptured line was disconnected from supply source but not removed from below the mill. Spillage was a one time occurrence. Release controls and collection equipment approved by the MDNR and MWRC have been installed between the point of release and Yerkes Drain (75). Recovery of about 290,000 gallons of fuel oil has occurred and currently, about 10 gallons is collected every six months.

A. Unit Description: Area from point of release beneath main mill building to Yerkes Drain (See Figure 5). See Appendix C Photographs 22-24 and 27 for photo details.

B. Period of Operation: 1973-74 to present

C. Waste Type: Fuel oil.

Waste Volume/Capacity: Approximately 200,000 - 500,000 gallons (reported as 280,000 gallons during VSI).

Waste Constituents: Fuel-related hydrocarbons

D. Release Controls: Monitoring wells, pea-gravel trench interceptor, ground water baffle, caissons and float oil skimmers.

E. Release History: Release occurred in late 1973 or early 1974 and was discovered on March 9, 1974.

F. Conclusions: The control and collection system has been MDNR and MWRC approved. Migration of remaining contaminants in a downgradient fashion does result in collection. Therefore, controls and collection appear adequate to eventually contain remaining fuel oil. Fuel oil recovery continues to occur but does so in small quantities. Therefore, cleanup to an acceptable degree with the existing collection system will probably be lengthy.

G. Observations: Oily film was not observed on the water in Yerkes Drain.

H. Sample Results: File information on soil and water sampling reported the fuel oil to be a high grade # 1,2, or 3 fuel oil but levels of fuel oil were not provided (57). File information also documents that extensive test pit excavation and monitoring well installation were once conducted) to define the area of extent of the release, but sample testing results were unavailable (83).

3.8 Unit Type: Former Landfill/Wastepile

Regulatory status: SWMU. This area is currently active for temporary storage of scrap materials prior to disposal. Due to the nature of the materials contained in the area: steel scrap, old equipment, etc., neither Quanex Corp - MST or PRC Engineering, a consultant to U.S. EPA which drafted a 1986 LOIS Certification, regarded the area as containing hazardous wastes (59, 64).

A. Unit Description: Abandoned landfill was 200 feet by 200 feet by 3 feet deep. Miscellaneous scrap was placed in the landfill for eight years. Wastepile was 50 feet by 3 feet by 3 feet high and temporarily stored non-hazardous scrap material for eight years. Current activity includes the temporary staging of old equipment prior to scrapping activities. See Figure 6 for location of the area and Photographs 15, 16 and 17 in Appendix C for details.

B. Period of Operation: Landfill 1967 (?) to 1977; Wastepile - 1977 to 1985 (Present).

C. Waste Type: Non-Hazardous solid wastes

Waste Volume/Capacity: Landfill 4400 CY, Wastepile 50 CY

Waste Constituents: Waste constituents include trash, bricks, scrap steel, broken concrete, steel scale and sand.

D. Release Controls: None

E. Release History: None reported.

F. Conclusions: Continue quarterly groundwater monitoring.

G. Observations: Scrap/equipment tended to be large in size and scattered throughout the area (not a pile as the name implies). Exact location of Monitoring Wells 16A & B with respect to area is uncertain.

H. Sample Results: Results of groundwater monitoring of nearby wells 16A & B, have shown an indication of copper (30 $\mu g/L$) and arsenic (2.3 $\mu g/L$). Copper and arsenic have also been found in other wells at low levels and Quanex Corp. - MST attributes them as background contaminants.

The monitoring results also report levels of other elements considered to be background in nature due to consistent findings at elevated levels in upgradient and downgradient wells (32,60). See Appendix E.

3.9 Unit Type: Filter Presses

Regulatory status: SWMU. The presses are active treatment units.

A. Unit Description: Clarifier sludge is dewatered in filter presses prior to offsite disposal to a Type II (non-hazardous) landfill. See Figure 6 for location and Figure 4 and Appendix C, Photograph No. 8, for additional information.

B. Period of Operation: 1988 - present

C. Waste Type: Lime stabilized waste pickle liquor sludge (LSWPLS).

Waste Volume/Capacity: Not determined.

Waste Constituents: Those constituents common to LSWPLS not stabilized with flyash. See Section 3.2 Part C for details.

D. Release Controls: Not determined.

E. Release History: None reported.

F. Conclusions: No action or further study appears necessary.

G. Observations: Equipment present and operational.

H. Sample Results: LSWPLS same as prior to use of filter press, see Section 3.2 Part H.

3.10 Unit Type: Neutralization Plant

Regulatory status: SWMU. This is active as a part of the treatment process. Waste pickle liquor is a hazardous waste (K062) before being treated due to its low pH (may not be the only criteria). Quanex Corp. - MST claims exemption of this waste from Part 264 and 270 requirements since the sewers and tanks in their "totally enclosed" treatment system meet the requirements of Part 261.4(c) and Parts 270.1(c)(2) iv and v(75).

A. Unit Description: This facility treats waste pickle liquor from the manufacturing process by using lime to neutralize sulfuric acid and cause sludge to settle out of solution. Lime stabilized waste pickle liquor is discharged to clarifiers which collect sludge and discharge liquid to Yerkes Drain per NPDES permit. The facility is located as shown on Figure 7. See Appendix C, Photograph 5, for details.

B. Period of Operation: ? (1969) - Present.

C. Waste Type: Waste pickle liquor stabilized by lime. K062 waste designation.

Waste Volume/Capacity: Not determined.

Waste Constituents: Water acid & chemicals, sulfuric acid pickle, acid rinse water, zinc phosphate, sodium stearate, cleaner and lime (See Figure 4).

D. Release Controls: Waste pickle liquor is delivered by enclosed sewer system, treated in contained area, and discharged to clarifers.

E. Release History: None reported.

F. Conclusions: No action appears to be required.

G. Observations: Construction neutralization treatment plant covered over monitoring wells 3, 14A and 14B.

H. Sample Results: None found in file information. U.S. EPA rejected a proposed delisting by Quanex Corp. - MST for the K062 effluent on August 24, 1988 due to groundwater concerns for the then-operating surface impoundments (20, Appendix E).

4.0 SUMMARY AND RECOMMENDATIONS

The principal environmental concerns at the Quanex Corp - MST facility involve unresolved determinations of status for the surface impoundments, sludge drying beds, and uncovered berm debris. The VSI provided information which verified the file information and revealed additional information necessary for a complete update and status check of all areas considered. A summary of, and recommendations for, each SWMU, including possible sampling or further analysis required, is provided as follows:

1. No further sludge testing will be necessary if MDNR accepts a Type III designation for the sludge and agrees to closure in-place of the material. If MDNR does not accept that designation, then sampling and testing during sludge removal to a Type II landfill will be required.

2. Sludge Drying Beds: MDNR acceptance of the Type III designation for the sludge will relieve the need for additional sampling. Denial of the Type III designation by MDNR should result in the performance of sampling during the sludge removal and disposal.

3. Former Acid Pits: The locations of the former acid pits are uncertain, closures (of unknown degree) have been reported, the pits' contents appear to have been non-hazardous LSWPLS and groundwater monitoring has revealed no obvious concerns. However, since little information about the pits is available and testing at these potential sources might reflect the long-term effects of the drying bed and impoundment sludges, sampling is recommended.

4. Landfill/Wastepile: This area is active for temporary storage of non-hazardous scrap materials. Groundwater monitoring wells are located nearby. Continued

periodic groundwater monitoring is recommended.

5. Uncovered Berm Debris: MDNR determination regarding the proposed work plan for the debris removal and disposal should be completed. Soil sampling during removal of the debris in accordance with MDNR determinations and actions should be performed.

6. Hazardous Waste Storage Facility B: No action appears to be necessary.

7. Hazardous Waste Storage Facility C: Area C is active and no releases have been reported. However, sampling and testing is recommended based on information that the diking and sump may have not been constructed prior to use of the facility.

8. Fuel Oil Release Area: No action appears to be necessary. Continue to monitor reports of fuel oil recovery from collection system.

9. Filter Press: This equipment is active and no releases have been reported. Disposal of LSWPLS is to a licensed Type II landfill. No further action appears to be required.

10. Neutralization Plant: It is active in the treatment process and no releases have been reported. Waste pickle liquor is contained and treated. Stabilized sludge settles out in clarifers and liquid is discharged per NPDES permit. No further action appears to be required.

TABLE 1

QUANEX CORP - MST
SOUTH LYON, MICHIGAN
SOLID WASTE MANAGEMENT UNITS SUMMARY

Solid Waste Management Unit	Operational Dates	Release History	Suggested Further Action
Surface Impoundments	1970 - 1988	None reported. Free liquid was discharged to Yerkes Drain per NPDES permit and sludge was put in sludge drying beds. Remaining sludge has been designated as Type II waste thus far.	MDNR determination on Type III designation and amended plan for closure in-place of sludge. Possible subsequent sampling and and testing.
Sludge Drying Beds	1970 - 1987	None known.	MDNR determination on Type III designation petition. Possible subsequent sampling and testing.
Former Acid Pits	1935 - 1969	None known.	Soil boring and sampling.
Landfill/Wastepile	1967(?)-77 /1977-1985 (Present)	None known.	Continue periodic groundwater monitoring.
Uncovered Berm Debris	Unknown	Unknown. May have occurred during surface impoundment construction.	MDNR approval/disapproval of proposed work plan. Soil sampling during excavation and disposal.
Hazardous Waste Storage Facility B	1984-1989	None known.	None.
Hazardous Waste Storage Facility C and Sump	1979 -Present	None known.	Sampling to confirm no releases prior to construction of containment.

TABLE 1 (CONTINUED)

QUANEX CORP - MST
SOUTH LYON, MICHIGAN
SOLID WASTE MANAGEMENT UNITS SUMMARY

Solid Waste Management Unit	Operational Dates	Release History	Suggested Further Action
Fuel Oil Release Area	1974-Present	Release occurred during late 1973 or early 1974.	None.
Filter Press	1988-Present	None known.	None.
Neutralization Plant	?(1988)-Present	None known.	None.

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*75. MDNR letter from Laura Lodisio to Donald Comfort, Quanex Corp, regarding acceptance of responses to violations cited as a result of the 8/23/84 RCRA Inspection - 2/6/85.

*76. US EPA letter from William Miner to Richard Russell, Quanex Corp., regarding Consent Agreement and Final Order No. V-W-84-R-023, - 2/4/85.

77. MDNR letter from Laura Lodisio to W.R. Scheib, Quanex Corp., regarding 9/19/84, response to RCRA violations from inspection on 8/23/84, - 10/4/84.

78. Closure and Post-Closure Plans for Hazardous Materials Storage Building and concrete pad and tank storage - 9/24/84.

*79. Spill Prevention Control and Countermeasure Plan (SPCCP) prepared 4/16/81, - 9/24/84.

*80. General Layout Plan of Hazardous Materials Storage Areas and Figures 1-4, - 9/24/84.

81. Quanex letter from W.R. Scheib to Laura Lodisio, MDNR - HWD, regarding violations cited for RCRA Inspection of 8/23/84, -9/19/84.

82. MDNR letter from Laura Lodisio to Dan Carnahan, Quanex Corp, regarding violations cited from RCRA Inspection performed 8/23/84, -8/30/84.

*83. MDNR letter from Wayne Denniston to D.A. Nebrig, MST Co., regarding oil identification for 1974 oil spill and attached exerpt from 10/23/74 report by Halpert, Neyer & Associates -8/27/74.

84. Section I and J, Appendix GN and Remarks from RCRA Inspection Form for 8/23/84 inspection - 8/23/84.

*85. Quanex letter from R.E. Russell to Timothy O'Mara, US EPA Region II, regarding extension request for submittal of Part B Application - 7/30/84.

86. Empty Barrel Inventory - 7/25/84.

87. Quanex memo from W.R. Scheib to Yetso, Rhodea, Misslitz, Lazzari, Ferguson, Simpson, Lewis, Borsh, Jones, Curry, Bergin, and Miller regarding RCRA regulations for disposal of used containers and plant responsibilities and policy - 7/23/84.

88. Figure 2 - Quanex Site Plan: Locations of Soil Borings and Monitoring Wells - 7/84.

89. Contingency Plan of Quanex Corp - 7/84.

90. Quanex letter from W.V. Merchant to Robert Courchaine, MDNR - ESD, regarding Continuing Recovery of Oil - 6/5/84.

91. US EPA letter from Basil Constantelos to Quanex Corporation regarding Complaint and Findings of Violations - 3/28/84.

*92. Quanex letter from Donald Carnahan to Delbert Rector, MDNR -HWD, regarding closure plan for HW storage facility - 3/6/84.

93. MDNR letter from Sandra Lopez to Bill Merchant, Quanex Corp, regarding compliance with Michigan Air Pollution Control Commission (MAPCC) - 2/21/84.

94. MDNR -AQD Activity Report for annual compliance prepared by Lopez -2/7/84.

*95. MDNR letter from William Miner to Richard Russell, Quanex Corp, regarding Consent Agreement and Final Order V-W-83-R-065, - 8/22/83.

96. Quanex letter from M.P. Robinson to Chuck Bikfalvy, MDNR - WQD, regarding RCRA Report violations cited from the 9/7/82 inspection -11/16/82.

97. MDNR - AQD Activity Report for annual compliance prepared by Yanochko - 11/15/82.

98. Clow Corporation: Report for Petition to Delist Sludge from Steel Finishing Operations - 11/82.

99. Quanex letter from M.P. Robinson to David Yanochko, MDNR - AQD, regarding coatings and painting at Quanex - 6/7/82.

100. MDNR letter from David Yanochko to Mel Robinson, Quanex Corp, regarding Emissions Inventory System discrepancy - 6/2/82.

101. MDNR letter from Kevin Tolliver to Mel Robinson, Quanex Corp, regarding compliance with air pollution rules - 7/22/81.

102. MDNR - AQD Activity Report for annual compliance prepared by Tolliver - 7/13/81.

103. Quanex letter from M.P. Robinson to Ron Waybrant, MDNR - O of HWM, regarding Waste Characterization Report - 6/29/81.

104. MDNR -AQD Activity Report prepared by Hanson - 3/27/81.

105. US EPA Notification of Hazardous Waste Activity - 10/14/80.

106. MDNR memo from Jack Larsen to Permit Unit Chief regarding Quanex Permit to Remove Scrubber - 11/1/78.

107. MDNR -AQD Activity Report prepared by Larsen - 9/22/78.

108. Quanex letter from Donald Comfort to Jack Larsen, MDNR - AQD, regarding torch station ventilation system - 7/27/78.

109. MDNR letter from Jack Larsen to G.R. Parsch, Quanex Corp., regarding permit to install and operate existing scrubber for torch station -6/29/78.

110. Quanex letter from G.R. Prasch to Jack Larsen, MDNR - APCD, regarding expanding facilities and permit changes - 4/4/78.

111. Quanex letter from K.W. Dodds to Mr. Larsen, MDNR, regarding plant expansion and request for application - 3/16/78.

112. MDNR letter from Marwan Khuri to G.R. Prasch, Quanex Corp, regarding compliance with Michigan Air Pollution Control rules - 4/6/76.

113. State Dept. of Public Health letter from Charles Oviatt to D.A. Nebrig, Quanex Corp., regarding provision of Permit No. 42-72, - 10/17/72.

114. Duall Industries letter from Philip Welch to John Sebenick, Michigan State Dept. of Public Health - Bureau of Industrial Health and Pollution Control, regarding efficiency test of fume scrubber - 9/11/72.

115. Bureau of Industrial Health and Air Pollution Control letter from John Sebenick to D.A. Nebrig, Quanex Corp., regarding request for scrubber performance data - 8/28/72.

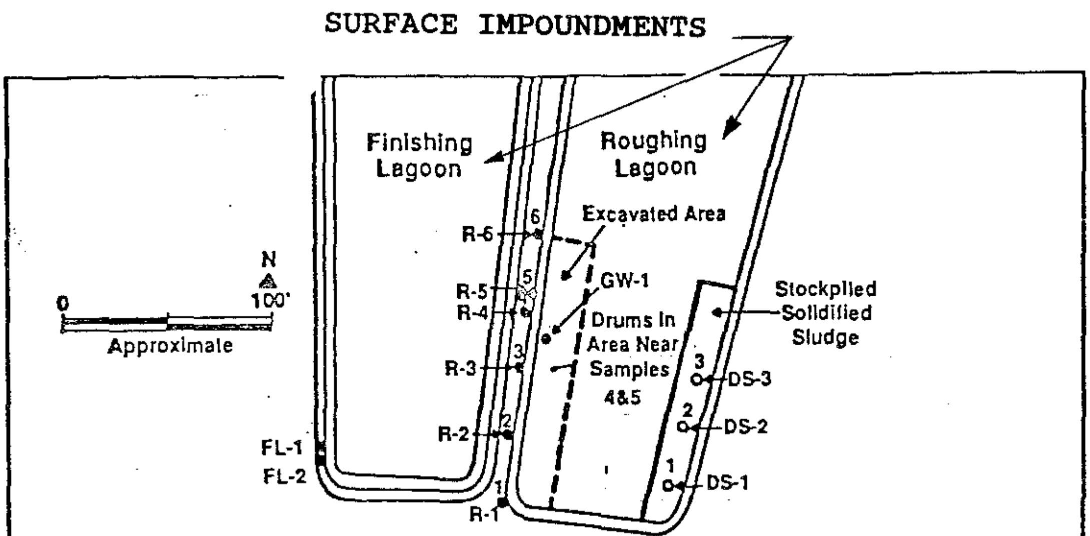
116. Bureau of Industrial Health and Air Pollution Control letter from William Cleary to Donald Nebrig, Quanex Corp, regarding ventilation plans and permit status - 2/14/72.

*117. MDNR letter from David Hales to John Yetso, Quanex Corp., regarding closure of HW Container Storage Unit - 2/5/90.

* References used in completing PR/VSI Report.

APPENDIX A

UNCOVERED BERM DEBRIS SAMPLING TEST RESULTS (REF. 9)



R-1	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.39

R-2	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.14

R-3	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.50

R-4	Roughing Lagoon
Toluene	0.059
1,1,1 - Trichloroethane	0.083
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

R-5	Roughing Lagoon
Toluene	0.043
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	0.07
Lead (E.P. Tox)	0.10

R-6	Roughing Lagoon
Toluene	0.039
1,1,1 - Trichloroethane	0.12
Chromium (E.P. Tox)	0.08
Lead (E.P. Tox)	3.6

GW-1	Groundwater
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (Totals)	*
Lead (Totals)	*

FL-1	Finishing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

FL-2	Finishing Lagoon
Toluene	0.08
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-1	Dried Sludge
Toluene	0.09
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-2	Dried Sludge
Toluene	0.14
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-3	Dried Sludge
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

Metals Results in mg/l
Volatile Results in mg/kg
* Non-Detect

Figure 1

Berm Sampling Locations and Analytical Results
Quanex Corporation

January, 1989 — 21086

EDI Engineering & Science

SOURCE: 9

SOURCE: REFERENCE NO. 9

5555 Glenwood Hills Parkway, SE • Grand Rapids, Michigan 49508 • (616) 942-9600

EDI Engineering & Science
Environmental Engineering, Geology, Biology and Chemistry

March 24, 1989

Ms. Ronda Hall, Engineer
Waste Management Division
Michigan Department of Natural Resources
Ottawa Street Building - South Tower
P O Box 30028
Lansing, MI 48909

RE: QUANEX IMPOUNDMENT BERM EXCAVATION

Dear Ronda:

The proposed work plan for the impoundment berm excavation is enclosed for your review. As you requested at our March 10, 1989 meeting, we have also mailed five hard copies to you and one copy directly to Lynne King at the Northville District Office. We look forward to receiving your comments the first week of April.

Please call me at (616) 942-9600 if you have any questions.

Sincerely,

EDI ENGINEERING & SCIENCE

K. Lynnes

Kathryn D. Lynnes
Project Manager
Environmental Compliance

KDL/mck

Enclosures

WORK PLAN TO REMOVE DEBRIS FROM THE BERMS SURROUNDING THE SOUTH SIDE OF THE SURFACE IMPOUNDMENTS AT THE QUANEX FACILITY IN SOUTH LYON, MICHIGAN

BACKGROUND

Michigan Seamless Tube Division of Quanex Corporation is closing two surface impoundments that contain a lime neutralized spent pickle liquor sludge from its steel finishing operation. During the sludge solidification process at the southwest end of the roughing lagoon, an area of debris was discovered in the berm separating the roughing lagoon and the finishing lagoon. The debris consisted predominantly of steel scrap but also included drum remnants. The majority of the debris was located in the dividing berm approximately 180 feet north from the south end of the lagoons. The debris area also appears to extend into the berm at the south side of the surface impoundments.

WASTE CHARACTERIZATION

On December 20, 1988, a total of eleven samples were taken from the area being studied: six soil samples were taken from the debris area within the berm, three samples from the stockpiled solidified sludge, and two soil samples from the western berm of the finishing lagoon. A water sample was also taken of the water which had entered the excavation adjacent to the debris area. The eleven solid samples and one water sample were analyzed for volatile organic scans 601 and 602. The soil samples were also analyzed for ten trace metals. Sampling locations and detectable analytical results are provided in Figure 1. The complete listing of analytical results is provided in Attachment I.

Only six of the total twelve samples were found to contain volatile organic constituents. These six samples contained low levels of toluene. Two of the six samples also contained low levels of 1,1,1-trichloroethane (TCA). One of the six samples, sample R-4 (see Figure 1), was taken of the white paint sludge-like material that was observed near one of the rusted drum remnants. The toluene and TCA may be related to the sludge which appears to have originated from the drums. Because the rusted drums account for only a small portion of the debris, the extent of any organic contamination is expected to be limited. The one ground water sample did not have detectable levels of any volatile organic constituents.

All twelve samples were analyzed for total metals. Only chromium and lead were detected in excess of 20 times the EP toxicity levels; consequently, EP toxicity analyses were performed on all soil samples for chromium and lead. The results of the EP toxicity analyses demonstrated that none of the soil samples are E.P. toxic as defined in 40 CFR 261.24. The results of the EP toxicity analyses are listed on Figure 1 and actual analytical lab data sheets are appended in Attachment I.

Because the origin of the debris cannot be clearly identified, soil or sludge removed from the debris area in the impoundment berms can be defined as non-hazardous Type II waste. The MDNR has agreed to Type II characterizations under similar circumstances in the past. The drum remnants from the berm area will be disposed of as Type II wastes. The landfill currently being considered for the Type II disposal is Arbor Hills landfill operated by BFI corporation.

REMEDIATION STRATEGY AND SCOPE OF WORK

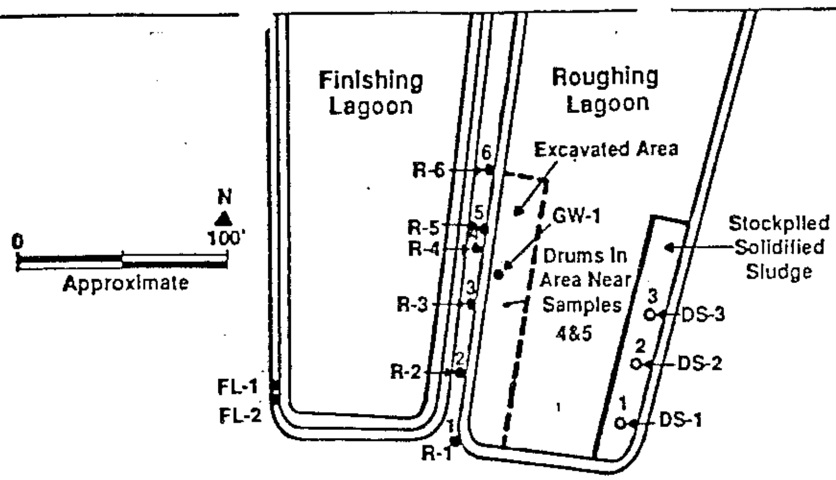
The objective of the work plan is to remove drum remnants, visibly impacted soils, and associated metal debris from the berm area surrounding the south side of the surface impoundments. The extent of soil removal is dependent on the extent of the drum remnants within the south berm area. The soil removal will extend beyond sample R-6 (Figure 1) where previous sampling was performed. The estimated extent of the remediation is shown in Figure 2. The fill material that composes this area includes the dividing berm that is positioned between the roughing and finishing lagoons.

Any buried drum remnants encountered will be removed along with visibly contaminated surrounding soils. The drums will be segregated, isolated and stockpiled on a staging pad located immediately adjacent to the excavation. A drum excavation and field sampling procedure protocol will be followed for any drums found within the fill area specified. The procedure for documenting and sampling the buried drum area is outlined in Attachment II. The contents of the exposed drum(s) will be analyzed to determine if the waste is hazardous by characteristic. These analyses will include total metals and EP toxicity. Associated metal debris from the berm area such as piping, steel cables and drums will be removed and disposed of or sent to a reclamation facility.

If residual contents associated with any of the drum remnants are observed, the soils underlying the residual contents of the drums will be scanned with a vapor photoionization detection (PID) meter. Any underlying soils which cause the PID meter to read over 5 ppm will also be excavated.

Written and photo documentation will be conducted in all stages of the remediation project.

A report documenting these activities will be submitted to the MDNR at the conclusion of the excavation. The report will include a summary of field activities, waste shipping records, analytical results, chain-of-custody records, and QA/QC procedures.



R-1	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.39

R-2	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.14

R-3	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.50

R-4	Roughing Lagoon
Toluene	0.059
1,1,1 - Trichloroethane	0.083
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

R-5	Roughing Lagoon
Toluene	0.043
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	0.07
Lead (E.P. Tox)	0.10

R-6	Roughing Lagoon
Toluene	0.039
1,1,1 - Trichloroethane	0.12
Chromium (E.P. Tox)	0.08
Lead (E.P. Tox)	3.6

GW-1	Groundwater
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (Totals)	*
Lead (Totals)	*

FL-1	Finishing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

FL-2	Finishing Lagoon
Toluene	0.08
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-1	Dried Sludge
Toluene	0.09
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-2	Dried Sludge
Toluene	0.14
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-3	Dried Sludge
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

Metals Results in mg/l
Volatile Results in mg/kg
* Non-Detect

Figure 1

Berm Sampling Locations and Analytical Results
Quanex Corporation

January, 1989

21086

EDI Engineering & Science

APPENDIX B

SLUDGE BEDS AND IMPOUNDMENTS:

CONSTITUENT LEVELS
(REF. 44, 50)

SLUDGE DRYING BED: SLUDGE SAMPLE CONSTITUENTS

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.0.5	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	<0.05	<0.08	<0.05	<0.06	0.21	0.11	<0.05	0.15	0.47	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	0.01	<0.01	0.04	<0.01	0.02	0.02	<0.01	<0.01	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	<0.02	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	----	Stnd. Units

SOURCE: 44

PARAMETER	04/29/87 BORING 4 Composite 0-8.0'	04/29/87 BORING 4 8.0-9.5'	04/29/87 BORING 4 9.5-10.0'	04/29/87 BORING 5 Composite 0-8.0'	04/29/87 BORING 5 8.0-9.2'	04/28/87 BORING 6 1.5'	04/28/87 BORING 6 5.0'	04/28/87 BORING 6 7.5	04/28/87 BORING 6 9.75'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.12	0.14	1.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.42	0.29	<0.01	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	<0.02	0.04	0.07	0.05	0.10	0.03	<0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	----	Stnd. Units

SOURCE: 44

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.05	0.21	<0.01	1.0	0.07	<0.01	0.04	0.11	0.08	0.01	mg/L
Zinc	<0.02	0.02	0.02	0.04	0.03	<0.02	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	----	Stnd. Units

SOURCE: 44

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Results of Analyses "As Collected" Sludge Samples Date:

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids, %	pH
West Lagoon						
Quadrant 1.	65	2.4	47	<0.5	--	--
Quadrant 2.	200	32	120	<0.5	--	--
Quadrant 3.	68	<2	52	<0.5	--	--
Quadrant 4.	73	3.6	58	<0.5	--	--
Composite	--	--	--	--	26.9	7.5
East Lagoon						
Quadrant 1.	180	4.6	81	<0.5	--	--
Quadrant 2.	160	6.2	90	<0.5	--	--
Quadrant 3.	72	<2	45	<0.5	--	--
Quadrant 4.	160	<2	72	0.6	--	--
Composite	--	--	--	--	29.7	8.0

* All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Date:

Results of Analyses "As Collected" Sludge Samples

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

Results of EP Toxicity Procedure

Table II

TO:

Date:

Parameters:	West Lagoon Composite (FINISHING IMPOUNDMENT)	East Lagoon Composite (ROUGHING IMPOUNDMENT)	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

SOURCE: 50

SOURCE: REFERENCE NO. 8

Type III Designation Petition

for the . . .

Surface Impoundments

prepared for . . .

Quanex
Michigan Seamless
Tube Division
South Lyon, Michigan

July, 1989

21157.01

EDI

ENVIRONMENTAL ENGINEERING ▪ GEOLOGY ▪ BIOLOGY ▪ CHEMISTRY

TYPE III DESIGNATION FOR THE SURFACE IMPOUNDMENTS

I. Administrative Information

A. Indicate whether the waste is hazardous.

The sludge is not hazardous.

The U.S. Environmental Protection Agency's ("EPA's") first list of hazardous wastes included two wastes from steel finishing operations: (1) K062, spent pickle liquor from steel finishing operations, and (2) K063, sludge from lime treatment of spent pickle liquor from steel finishing operations. At that time, the Agency was concerned that high levels of lead and hexavalent chromium might migrate from these wastes into the environment.

On November 12, 1980, EPA deleted K063 materials from the hazardous waste list because data indicated that the hexavalent chromium and lead are present in immobile forms. Rather than listing K063 material as hazardous, the Agency temporarily retained regulatory control of this sludge under the "derived-from" rule, 40 CFR 261.3(c)(2).

EPA exempted K063 materials from this presumption of hazardousness on June 5, 1984 after reviewing additional information, including site-specific delisting petitions. In all cases, test results showed that the leachate values for hexavalent chromium and lead in the lime-stabilized sludge were well below maximum permissible EP toxicity limits.

Under the K063 exemption, waste pickle liquor sludge from the lime stabilization of spent pickle liquor is not a hazardous waste under 40 CFR 261.3(c)(2)(ii) as long as the sludge does not exhibit one or more hazardous waste characteristics. The sludge generated at the Quanex facility does not exhibit any hazardous waste characteristics and is therefore considered non-hazardous.

B. Indicate the name and site address of facility producing waste.

Quanex Corporation
Michigan Seamless Tube Division
400 McMunn
South Lyon, Michigan 48178

C. List facility contact person and phone numbers.

Donald Comfort, P.E.
Engineering Manager
313/437-8117

D. Include signed easement statements, if applicable.

Not applicable

II. <u>Waste Stream Information</u>

A. Description of waste for which designation is requested.

Lime neutralized spent pickle liquor sludge resulting from past wastewater treatment operations that has been stabilized with flyash.

This Type III Designation Petition is for the sludge that accumulated in surface impoundments between 1970 and 1988. This sludge is characteristically different from the sludge currently being produced by manufacturing operations in that it has been solidified with a bituminous coal fly and bottom ash. The process of adding coal fly and bottom ash to the sludge is described in Section III, Manufacturing Process.

B. Amount of waste generated monthly and annually (average and maximum values).

Currently, the facility produces no waste subject to this petition. The average amounts of sludge generated at the facility are 1250 tons per month for a total of 15,000 tons per year.

C. Indicate where waste is currently disposed.

The wastes subject to this petition are located in interim status surface impoundments that are being closed pursuant to the Resource Conservation and Recovery Act (RCRA).

The sludge generated from the current wastewater treatment operations is being disposed of in an off-site Type II solid waste landfill. The sludge is separated from the waste stream in the recently renovated wastewater treatment facility located on-site. Prior to the renovation of the wastewater treatment facility in 1988, the treated waste stream was discharged directly to the surface impoundments where the sludge was allowed to accumulate.

D. Indicate proposed disposal location for designated inert or Type III wastes.

Two sludge disposal options have been evaluated. The first sludge disposal option is closure of the surface impoundments in place. This option includes an appropriately designed cover system and ground water monitoring program. The locations of the impoundments are displayed in Figure 1. The second sludge disposal option consists of removing the sludge from the surface impoundments and transporting it to an approved off-site disposal facility. The two such facilities evaluated for sludge disposal are:

1) The Sibley Quarry Type III landfill located in Trenton, Michigan which is owned and operated by the Detroit Edison Company; and

2) The Rockwood landfill located in South Rockwood, Michigan which is owned and operated by Wayne Disposal, Inc.

The available capacity of each of these facilities is being evaluated. Preliminary discussions with the landfill owners indicate that capacity restrictions may not allow sludge disposal at a single off-site landfill.

III. Manufacturing Process

A. Describe process used to produce wastes.

Current manufacturing processes employed at the facility are the same as those used to generate the waste subject to this petition. Quanex manufactures seamless steel tubing from round steel bars. The steel bars are first heated, pierced, and air cooled. The tubing is then immersed in a sulfuric acid pickling bath to remove the iron oxide scale formed during heating and rinsed in cold water. Any surface defects are then removed from the tubing by grinding.

The tubing is then moved to the pickle houses where a two-step zinc phosphate and sodium stearate drawing lubricant is applied by immersing the tubing in tanks. After a hot water rinse, the tubing is drawn through dies on a "draw bench" to achieve the desired diameter and shape. Tubing which requires further reduction in diameter is annealed in roller hearth furnaces to soften the steel, cleaned with acid, lubricated and drawn again.

After the tubing is cold drawn to its final size, it is straightened, cut to length, and inspected. Some material which requires ultrasonic testing is immersed in a cleaner tank which contains a combination cleaner and rust inhibitor.

The pickling operations are located in four "pickle houses". All loads of tubing pass through No. 2 pickle house to remove the scale and iron oxide, which is produced on the surface of the tubing during the heating, piercing, and cooling processes. Pickling for application of lubricant is done in all four pickle houses as required by the location of the cold draw operations. Cleaners are used in only pickle houses No. 1 and 4.

The sulfuric acid pickling bath solution contains approximately 11 percent free acid and 4 to 5 percent iron. The spent acid from the pickle houses is transferred to the waste treatment plant through enclosed underground pipelines. The other rinse waters from the pickle houses are also transferred to the waste treatment plant in the same manner.

At the waste treatment plant a lime slurry is metered into the waste stream to neutralize the acidic solutions. This mixture is aerated to maintain a suspension of solids and to promote oxidation. Lime is added automatically as necessary to maintain a pH of 9.0. The mixture is then pumped to the waste water treatment plant where the suspended solids settle out. The solids are removed from the waste stream at the wastewater treatment plant, dewatered, collected and transported off site for disposal in a licensed Type II landfill. The liquid portion of the mixture is discharged to surface waters through an NPDES outfall.

Prior to the expansion of the wastewater treatment facility in 1988, the lime-stabilized waste stream was discharged directly to the surface impoundments. The suspended solids in the waste stream then settled out in the surface impoundments before the supernatant was discharged to the surface waters through the NPDES outfall. From 1970 to 1987 sludge was periodically removed to the sludge drying beds. During this time two separate techniques were used to transport the sludge from the surface impoundments to the sludge drying beds. The first method, dredging, was used from 1971 to 1975. The second method, pumping from a barge, was used from 1975 to 1987.

Immediately after completion of the wastewater treatment facility expansion in early November 1988, the surface impoundments were taken out of service. As part of the surface impoundment closure activities, the accumulated sludge was solidified. Before the solidification process was initiated, the impoundment discharge gates were lowered to their minimum height. The free liquid was discharged to the NPDES outfall (MI 0001902). The remaining liquid below the gate level was pumped from the east impoundment into the west impoundment. The remaining liquid in the west impoundment was then pumped to the NPDES outfall.

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Solidification of the sludge in the surface impoundments began on November 21, 1988 and was completed March 3, 1989. The estimated total mass of sludge before solidification was 30,700 tons. A total of 16,200 tons of calcium oxide solidification agent (including bituminous coal fly and bottom ash) was injected and mixed with the sludge. The estimated total mass of solidified sludge in the impoundments is thus 46,900 tons. This total mass estimate is based upon 1 cubic yard of sludge having a mass of 2,600 lbs. All the mass estimates are based upon the sludge depth recorded during the drilling of soil borings within the impoundments. The depth of the sludge varies within the impoundments apparently due to drag line operations used to remove sludge from 1971 through 1975.

The solidification process started from the southeast corner of the east impoundment and proceeded north. A John Deere 690 excavator was fitted with a manifold of four steel tubing fingers each 10 feet long. This configuration was designed to inject the fly ash mixture below the surface of the sludge to the maximum depth of the surface impoundments.

The fly ash mixture was conveyed to the excavator from a bulk pneumatic tank truck using a six-inch hose at a rate of 60 tons per hour. The excavator fingers swept back and forth from the bottom to the top of the sludge until enough material was injected to solidify the sludge in a 20-foot by 20-foot area. After setting up for 24 hours, this material was solid enough to allow the excavator to move on to the edge of the now solidified sludge and continue on to the north. This process continued until all of the sludge in both impoundments was solid.

B. Include a schematic diagram of the process.

A schematic diagram of the manufacturing process is provided in Figure 2.

C. Include a list of raw material ingredients (or material safety data sheets) used in the process. Indicate which raw material ingredients would <u>not</u> be expected to be in the waste and why.

Material safety data sheets for the raw material ingredients are provided in Appendix 1. The material safety data sheet for the bituminous coal fly and bottom ash used in the sludge solidification process is also attached in this appendix. Sulfuric acid would not be expected to be in the sludge because it is neutralized by the addition of lime.

IV. Sampling Techniques

A. Indicate name, address and contact person of facility that sampled waste stream.

EDI Engineering & Science
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, Michigan 49506

Contact Person for EDI is Kathryn Lynnes

B/C Describe sample strategy used to ensure that waste was representatively sampled. Include number of samples taken per waste stream, sampling methods used, sample preservation method used, and type of container used to collect samples.

The locations of the two surface impoundments are displayed in Figure 1. A dividing berm, approximately 20 feet wide, separates the two impoundments to form the roughing impoundment and the finishing impoundment. The roughing impoundment is located to the east of the dividing berm and the finishing impoundment to the west. The impoundments are a mirror image of each other; each is approximately 550 feet long (north to south) and 70 to 150 feet wide (west to east). The elevation of the top of the sludge in the surface impoundments is approximately 915 feet (USGS) in the roughing impoundment and 910 feet (USGS) in the finishing impoundment. The elevation of the land surface surrounding the impoundments is approximately 920 feet (USGS).

A total of eight soil borings were drilled to collect representative samples of the sludge in the surface impoundments. The field investigation to drill the soil borings in the surface impoundments was initiated and completed the week of March 27, 1989. Of the eight soil borings that were drilled, borings B-5 through B-8 (four borings) were drilled in the roughing impoundment and borings B-1 through B-4 (four borings) were drilled in the finishing impoundment (see Figure 1). The locations of the borings in the finishing impoundment (west) and the roughing impoundment (east) were drilled in the designated locations in part to avoid ponded water, hummocky terrain inaccessible to the drilling rig and extremely hard areas in which the solidified sludge could not be successfully penetrated by available drilling techniques.

The eight soil borings installed in the surface impoundments were drilled using hollow stem auger and continuous split spoon sampling techniques (ASTM Standard Method 1586-84 and 1587-83). These methods allowed for undisturbed sludge samples to be collected, sludge thickness to be determined, and the lithology to be described. The eight soil boring logs drilled in the surface impoundments are attached in Appendix 2. A summary of soil borings B-1

through B-8 is presented in Table 1. The hollow stem augers and split spoons were steam cleaned in between the drilling of each soil boring to prevent cross contamination.

Two sludge samples were collected from each soil boring to ensure that representative vertical sludge samples were collected. These samples were collected at distinct intervals within the thickness of the sludge layer. Table 2 displays the boring number and the intervals in which the samples were collected. A sufficient amount of sample was collected from each interval to allow appropriate laboratory analyses. The samples were placed in plastic containers and transported to EDI Engineering and Science Laboratory. The two sludge samples from each soil boring were composited in the laboratory prior to analyses. The sludge samples were composited from selected intervals in each boring to assure that there was vertical representation of the sludge with depth. No sample preservation methods were necessary. Appropriate chain-of-custody documentation was maintained.

V. Sample Analysis

A. Indicate name, address and contact person at laboratory.

EDI Engineering & Science
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, Michigan 49506

Contact person for EDI is John Emrich - Client Service Supervisor.

B. List parameters tested for, analytical detection levels and test methods used.

The sludge samples, composited in the laboratory, were analyzed for total metals and EP toxicity for arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc. The laboratory methods used for total metal analyses and EP toxicity are presented in Tables 3 and 4 respectively.

Prior to the industry-wide delisting of the sludge by the EPA on June 5, 1984, Hydro Research Services completed a delisting petition for the K063 sludge. In the surface impoundment one composite sample from each of the roughing and finishing impoundment was collected and analyzed for EP toxicity total metals. This .eport is provided in Appendix 3.

C. Include quality assurance/quality control data to demonstrate accuracy of data.

Quality assurance/quality control data for all laboratory analyses presented are provided in Appendix 4.

D. Include analytical chemical data for all those parameters appropriate to your waste stream.

The results of the total metals and EP toxicity analyses are presented in summary Tables 6 and 7 respectively. The actual laboratory data sheets for the total metals are attached in Appendix 5 and for EP toxicity in Appendix 6.

Table 6 displays the total metal analyses for the sludge composites including one additional column labeled "average value for all sludge composites". The average value was computed using all eight analyses for each individual parameter.

The EP toxicity analyses for the sludge composites (Table 7) did not exceed the EP toxicity maximum concentration limits set forth in 40 CFR 261.21 Table 1. The maximum concentration limits are listed as an additional column in Table 7. This confirms that the sludge, as represented by the sludge samples, is not characteristically hazardous.

The EP toxicity analyses of the sludge can also be compared to the primary and secondary drinking water standards set forth in 40 CFR 141.11 and 143.3 respectively. These limits are specified in Table 3 and are also included in an additional column on Table 7. The majority of the constituents (90%) in the composited sludge samples were below the specified primary and secondary drinking water standards. The constituents that were not detected above the drinking water standards include all sludge samples analyzed for arsenic, cadmium, chromium, copper, lead and silver. Seven out of eight sludge samples for barium, six out of eight sludge samples for zinc and mercury, and five out of eight sludge samples for selenium were below the primary and secondary drinking water standards. With the exception of anomalous analytical results for mercury, all the constituents that exceeded the drinking water standards were less than two times the designated standards. The table below lists the sludge samples in which the constituents exceeded the set drinking water standards.

Analytical Parameter	Primary/Secondary Drinking Water Standards * (mg/l)	Sludge Samples Exceeding Drinking Water Standards	Detected Value (mg/l)	Less than twice Primary/Secondary Drinking Water Standards
Barium, Total	*1.0*	*B-4*	*1.1*	*Yes*
Zinc, Total	*5.0*	*B-4*	*5.9*	*Yes*
		B-7	*5.5*	*Yes*
Mercury	*0.002*	*B-2 original*	*0.027*	*No*
		B-2 Re-analyses	*0.0004*	*Yes#*
		B-5 original	*0.0082*	*No*
		B-5 Re-analyses	*0.0008*	*Yes#*
Selenium	*0.01*	*B-2*	*0.013*	*Yes*
		B-3	*0.019*	*Yes*
		B-6	*0.016*	*Yes*

* *40 CFR 141.11, 40 CFR 143.3*

Less than the Primary/Secondary Drinking Water Standard

The above constituents do not appear to be impacting the ground water immediately beneath the surface impoundments. Extensive historical ground water monitoring around the surface impoundments from the RCRA Interim Status Detection Monitoring Program and Ground Water Quality Assessment Plan indicates that the ground water has not been affected by the sludge. First, barium and zinc concentrations in the ground water beneath the impoundments have never statistically exceeded background levels.

Second, the extensive ground water analyses from the on-site monitoring program and the assessment plan demonstrate that mercury has never been detected in the ground water. In addition, mercury has never been used in the manufacturing process to create seamless tubing at the Quanex Facility. The two sludge samples that indicated mercury in exceedance of the drinking water standard were re-analyzed. The additional mercury analyses performed on these two sludge composite samples (B-2, B-5) did not exceed the set drinking water standards. The laboratory data sheets for the additional analyses are attached in Appendix 6 and the results are presented in Table 7. This indicated that the sludge is unlikely to be a potential source of mercury contamination.

Third, selenium has been observed only sporadically in the ground water at the facility in samples from a single monitoring well (MW12A). Selenium at MW12A has only been statistically detected above background levels once since 1987. It bears emphasizing that selenium has also been detected at the upgradient background monitoring well at the Quanex facility. Further information concerning the ground water quality under the surface impoundments is provided in the Supplementary Information for the K062 Delisting Petition presented to the MDNR in January 1989.

No other parameters were tested for because no other compounds or constituents are expected to be present in the sludge. Chloride and total sodium, potassium, magnesium, calcium and nitrogen are either not present in the sludge or are found in an immobile form and pose no threat to surface waters or ground water. Determining BOD is not necessary because there are no organics present in the sludge. The process that produces the sludge is uncomplicated and uses limited raw materials.

Figures

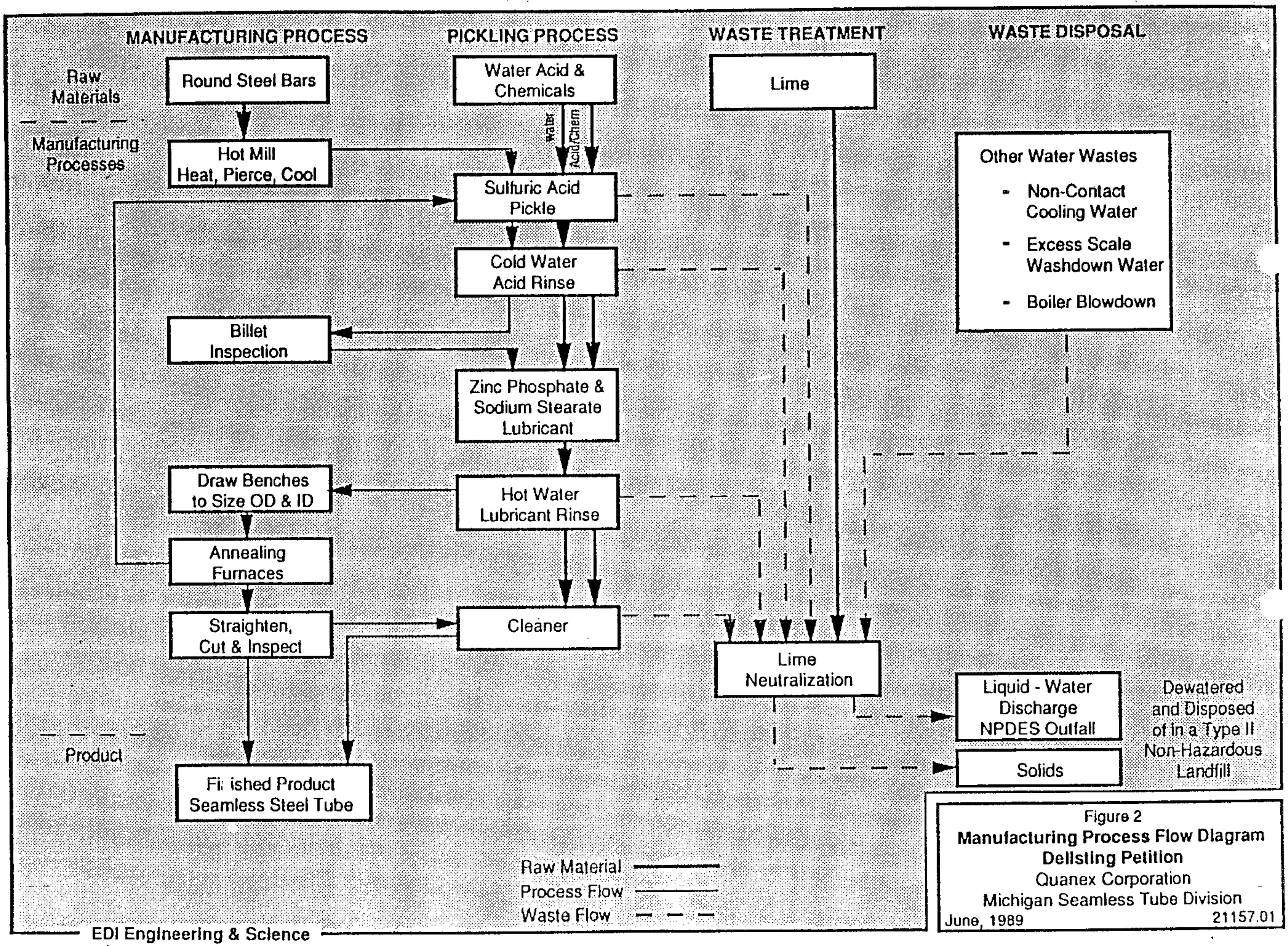


Figure 2
Manufacturing Process Flow Diagram
Delisting Petition
Quanex Corporation
Michigan Seamless Tube Division
June, 1989 21157.01

SOURCE: REFERENCE NO. 33

TYPE III DESIGNATION

I. <u>Administration Information</u>

A. Indicate whether the waste is hazardous.

The waste sludge is not hazardous. The sludge was originally defined as a listed hazardous waste (K063 - sludge from lime treatment of spent pickle liquor from steel finishing operations) by the U.S. Environmental Protection Agency but was delisted by the Agency on June 5, 1984. This industry wide delisting became effective on December 5, 1984.

The K063 sludge was originally listed because the EPA was concerned that high levels of lead and hexavalent chromium could migrate from these wastes to the environment. The American Iron and Steel Institute (AISI) presented data to the Agency which indicated that the hexavalent chromium and lead are in an immobile form. The Agency then reviewed additional available data including a detailed evaluation of site-specific delisting petitions submitted by the iron and steel industry. In all cases, the leachate values for hexavalent chromium and lead were well below the maximum permissible EP toxicity limits. As a result of these investigations, the sludge was delisted by the EPA.

Waste pickle liquor sludge from the lime stabilization of spent pickle liquor which is produced by an individual is generally not a hazardous waste under 40 CFR 261.3(c)(2)(ii) as long as the sludge does not exhibit one or more hazardous waste characteristics. The waste sludge generated at the Quanex facility does not exhibit any of the characteristics of hazardous waste and is therefore considered non-hazardous.

B. Indicate the name and site address of facility producing waste.

Quanex Corporation
Michigan Seamless Tube Division
400 McMunn
South Lyon, Michigan 48178

RECEIVED
JAN 29 1988
WASTE MANAGEMENT DIV

C. List facility contact person and phone numbers.

Donald Comfort, P.E.
Engineering Manager
313/437-8117

D. Include signed easement statements, if applicable.

II. Waste Stream Information

A. Description of waste for which designation is requested.

Sludge resulting from the lime neutralization of spent pickle liquor.

B. Amount of waste generated monthly and annually (average and maximum values).

The average amounts of sludge generated monthly and annually are 240 tons and 2880 tons, respectively.

C. Indicate where waste is currently disposed.

The sludge generated from 1970 to 1987 was deposited in two drying beds located at the west end of the Quanex facility (see Figure A). Sludge is no longer being deposited in the two drying beds.

D. Indicate proposed disposal location for designated inert or Type III wastes.

A disposal site for the waste sludge has not been chosen at this time. A disposal location will be chosen after the MDNR has issued the waste designation.

III. Manufacturing Process

A. Describe process used to produce wastes.

Quanex manufactures seamless steel tubing from round steel bars. The steel bars are heated, pierced, and air cooled. After cooling, the tubing is immersed in a sulfuric acid pickling bath to remove the iron oxide scale formed during heating. The tubing is then immersed in cold water to remove the excess acid and moved to a billet inspection area where defects are removed.

After inspection, the tubing is again moved to the pickle houses where a two-step zinc phosphate and sodium stearate drawing lubricant is applied by immersing the tubing in tanks. The tubing is then rinsed in hot water and is ready for cold draw, the sizing of the outside diameter and wall on draw benches. Tubing which requires further reduction in diameter is annealed in roller hearth furnaces to soften the steel. After annealing, the tubing is moved to pickle houses for acid cleaning and lubricant application.

After the tubing is cold drawn to its final size, it is straightened, cut to length, and inspected. Some material which requires ultrasonic testing is immersed in a cleaner tank which contains a combination cleaner and rust inhibitor.

The pickling operations are located in four "pickle houses". All loads of tubing pass through No. 2 pickle house to remove the scale and iron oxide, which is produced on the surface of the tubing during the heating, piercing, and cooling processes. Pickling for application of lubricant is done in all for pickle houses as required by the location of the cold draw operations. Cleaners are used in only pickle houses No. 1 and 4.

The sulfuric acid pickling bath solution contains approximately 11 percent free acid and 4 to 5 percent iron. The spent acid from the pickle houses is transferred to the waste treatment plant through enclosed underground pipelines. The other rinse waters from the pickle houses are also transferred to the waste treatment plant in the same manner.

At the waste treatment plant a lime slurry is metered into the waste stream to neutralize the acidic solutions. This mixture is aerated to maintain a suspension of solids and to promote oxidation. Lime is added automatically as necessary to maintain a pH of 9.0. This mixture is then pumped to the surface impoundments where the suspended solids settle out. The liquid portion is discharged to the surface waters through an NPDES outfall.

Once a year the solids that accumulate in the surface impoundments were pumped to the drying beds. The sludge is now being accumulated in the surface impoundments pending disposition of this petition.

B. Include a schematic diagram of the process.

A schematic diagram of the manufacturing process is provided in Attachment G.

C. Include a list of raw material ingredients (or material safety data sheets) used in the process. Indicate which raw material ingredients would <u>not</u> be expected to be in the waste and why.

Material safety data sheets for the raw material ingredients are provided in Attachment J. Sulfuric acid would not be expected to be in the waste sludge because it is neutralized by the addition of lime.

IV. <u>Sampling Techniques</u>

A. Indicate name, address and contact person of facility that sampled waste stream.

EDI Engineering & Science
611 West Cascade Parkway, S.E.
Grand Rapids, Michigan 49506-2179

Contact person for EDI is Kathryn Lynnes

B/C Describe sample strategy used to ensure that waste was representatively sampled. Include number of samples taken per waste stream, sampling methods used, sample preservation method used, and type of container used to collect samples.

The original MDNR approved sampling plan for the two sludge drying beds is discussed in EDI Engineering & Science's letter dated February 11, 1987, to Ms. Laura Nuhn of the MDNR. The salient points of this plan are outlined below.

The original sampling plan was based on the assumption that the sludge in the drying beds was homogenous, both vertically and laterally. A systematically aligned random sampling plan was proposed to ensure that sample bias was eliminated. One grid point was to be established on the fence corner northwest of the sludge drying beds and the grid axis was to run north-south and east-west, at intervals of 120 feet. The proposed grid is shown in Attachment A.

*After the grid was established, two random numbers (x,y) were chosen both between 0 and 120, and the sampling locations were established as the location within each grid with the chosen x and y coordinates (location 0,0 representing the southwest corner of each grid interval). The two random numbers (130, 916) were arrived at by selecting two numbers from a three-digit random number table. The fraction of 120 feet was then determined by the formula (120 *N/1000) where n = three-digit random number:*

*E-W (130/1000) * 120 = 15.6 feet*
*N-S (916/1000) * 120 = 109.9 feet*

These numbers represent x and y coordinates. Sampling locations were established by starting at the southwest corner of each grid and setting a point with (x, y) coordinates 109.9 feet north and 15.6 feet east. The ten sampling locations are shown in Attachment B.

On a visit to the sludge drying bed site on April 20, 1987, it was discovered that the sludge will not support the weight of sampling personnel. This raised great concern for the safety of the people taking samples from the middle of the drying beds. After verbal consultation with Mike Czuprenski of the MDNR on April 24, 1987, it was decided that sampling locations would be moved away from the center of the drying beds. Eleven sampling locations were chosen on the perimeter of the beds, and these sites are shown in Attachment C.

Hand augers were used to obtain the sludge samples in accordance with ASTM D1452-80, "Standard Practice for Soil Investigation and Sampling by Auger Borings." The augers were rinsed with distilled water between samples to prevent cross-contamination. The samples were placed in plastic containers and brought to EDI Engineering & Science's laboratory. No sample preservation methods were necessary. Appropriate chain-of-custody documentation was maintained. Sludge boring log sheets for the eleven sampling locations are provided in Attachment D.

V. Sample Analysis

A. Indicate name, address and contact person at laboratory.

EDI Engineering & Science
611 Cascade West Parkway, S.E.
Grand Rapids, Michigan 49506-2179

Contact person for EDI is Thomas E. Campbell - Quality Assurance Supervisor.

B. List parameters tested for, analytical detection levels and test methods used.

Leachate was derived from the sludge samples following ASTM Method D 3987-81, Standard Test Method for Shake Extraction of Solid Waste with Water. The leachate derived from this method was analyzed for arsenic, barium, cadmium, chromium, lead, silver, copper, selenium, iron, manganese, mercury, nitrate, pH, and zinc. These parameters were chosen from the list of inorganic parameters which have primary or secondary drinking water standards listed in 40 CFR 141.11 and 143.3 (see Attachment E). The leachate was analyzed using Method 200.289 from Standard Methods for the Examination of Water and Wastewater, *15th Edition, APHA, AWWA, CWPCF, 1980, or Method 303 A-E from* Methods for Chemical Analysis for Water and Wastes, *USEPA60014-79-020, revised March, 1982.*

Prior to the industry-wide delisting of the sludge by the EPA on June 5, 1984, Hydro Research Services completed a delisting petition for the K063 sludge. The report contains representative EP toxicity data. This report is provided in Attachment H.

C. Include quality assurance/quality control data to demonstrate accuracy of data.

Quality assurance/quality control data is provided in Attachment I.

D. Include analytical chemical data for all those parameters appropriate to your waste stream.

The results and analytical detection levels for the parameters tested for are provided in Attachment F. The results of the EP toxicity testing are provided in Attachment H.

No other parameters were tested for because no other compounds or constituents are expected to be present in the waste sludge. Chloride and total sodium, potassium, magnesium, calcium and nitrogen are either not present in the sludge or are found in an immobile form and pose no threat to surface waters or groundwater. Determining BOD is not necessary because these are no organics present in the sludge. The process that produces the waste sludge is uncomplicated and uses limited raw materials.

ATTACHMENT F-2

CHEMICAL ANALYSIS OF SLUDGE SAMPLES
(DETECTED CONSTITUENTS ONLY)

See II. B. in the beginning summary to find out ~~the~~ all the parameters that were tested for. These are detected constituents.

	04/28/87 BORING 1	04/28/87 BORING 1	04/28/87 BORING 1	04/28/87 BORING 1	04/28/87 BORING 2	04/28/87 BORING 2	04/28/87 BORING 2	04/29/87 BORING 3 Composite	04/29/87 BORING 3 Composite		
	0.0-1.5'	*5.0-6.0'*	*8.75'*	*9.5'*	*3.0'*	*6.25-7.25'*	*8'*	*0-4'*	*5.0-9.0'*		
PARAMETER										**DETECTION LIMIT**	**UNITS**
Arsenic	--	2.0	--	--	--	--	--	--	--	2.0	ug/L
Lead	--	--	--	--	0.21	0.11	--	0.15	0.47	0.05	mg/L
Iron	--	0.01	--	0.04	--	0.02	0.02	--	--	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	--	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	---	Std. Units

	04/29/87 BORING 4 Composite	04/29/87 BORING 4	04/29/87 BORING 4	04/29/87 BORING 5 Composite	04/29/87 BORING 5	04/28/87 BORING 6	04/28/87 BORING 6	04/28/87 BORING 6	04/28/87 BORING 6		
	0-8.0'	*8.0-9.5'*	*9.5-10.0'*	*0-8.0'*	*8.0-9.2'*	*1.5'*	*5.0'*	*7.5*	*9.75'*		
PARAMETER										**DETECTION LIMIT**	**UNITS**
Lead	0.12	0.14	1.8	--	--	--	--	--	--	0.05	mg/L
Iron	0.02	0.04	--	--	--	--	--	--	--	0.01	mg/L
Manganese	0.42	0.29	--	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	--	0.04	0.07	0.05	0.10	0.03		0.02	mg/L
Nitrogen, Nitrate	--	--	--	--	--	--	0.28	--	--	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	---	Std. Units

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
[illegible]d	0.05	–	–	–	–	–	–	–	–	0.05	mg/L
Mercury	–	–	–	–	–	–	–	–	0.78	0.50	ug/L
Silver	–	–	–	–	–	–	–	–	0.06	0.01	mg/L
Manganese	0.05	0.21	–	1.0	0.07	–	0.04	0.11	0.08	0.01	mg/L
Zinc		0.02	0.02	0.04	0.03	–	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	–	–	–	–	–	0.08	–	–	–	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	—	Std. Units

ATTACHMENT G

SCHEMATIC DIAGRAM OF MANUFACTURING PROCESS

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

334-1630
334-4747

TO:

Results of Analyses "As Collected" Sludge Samples

Date:

Totals

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9 ppm	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

34-1630
34-4747

Results of EP Toxicity Procedure

Table II

TO:

EP tox

Date:

Parameters:	West Lagoon Composite	East Lagoon Composite	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH *	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

SOURCE: REFERENCE NO. 44

611 Cascade West Parkway, SE • Grand Rapids, Michigan 49506-2179 • (616) 942-9600

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

June 26, 1987

JUL 1' 1.

GQD-DETROIT DIST

Mr. Mike Czuprenski
Michigan Department of Natural Resources
Groundwater Quality Division
1550 Sheldon
Northville, MI 48167

RE: QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISON
SOUTH LYON, MICHIGAN - SLUDGE DRYING BEDS

Dear Mike:

Our original approved sampling plan for the two sludge drying beds at the Michigan Seamless Tube Division of Quanex Corporation, South Lyon, Michigan, is discussed in our letter dated February 11, 1987 to Ms. Laura Nuhn of the MDNR. The purpose of the sampling plan is to determine if the solids in the drying beds are inert. In order to carry out this purpose, the original approved sampling plan needed to be modified. This was necessitated by the unsafe working conditions at the drying beds.

In our original sampling plan, we proposed to eliminate sample bias by using systematically aligned random sampling. In this systematically aligned random sampling plane, a grid with a grid interval of 120 feet was chosen for the sludge drying beds. To establish a repeatable grid, one grid point was to be established on the fence corner northwest of the sludge drying beds and the grid axis was to run north-south and east-west. This proposed grid is shown in Attachment A.

Next, two random numbers (x, y) were chosen both between 0 and 120, and the sampling locations were established as the location within each grid with the x and y coordinates. (Location 0,0 will represent the southwest corner of each grid interval). The two random numbers (x, y) were arrived at by first looking up two numbers from a three-digit random number table. The fraction of 120 feet was determined by the formula (120 * n/1000) where n = three-digit random number. The two random numbers are 130 and 916, so:

E-W (130/1000) * 120 = 15.6 feet
N-S (916/1000) * 120 = 109.9 feet

These numbers represent x and y. Therefore, starting at the southwest corner, a distance of 109.9 feet is traveled north and then a distance of 15.6 feet is traveled east. This establishes the sampling location within each grid. Using this method, ten sites would fall within the sludge drying beds. These sites are shown on Attachment B.

Considering the expected absence of lateral variation within the sludge beds, this was determined to be a sufficient number of sampling locations to describe the wastes. If any unexpected variations were observed, a second round of sampling would have been initiated.

On a visit to the sludge drying bed site on April 20, 1987, it was discovered that when a person tried to walk on the sludge, that person would sink about a foot into it. This raised great concern for the safety of the people taking core samples from the middle of the drying beds. Therefore, after verbal consultation with you on April 24, 1987, it was decided that the location of the sampling sites would be moved away from the center of the drying beds. Eleven sites were chosen on the perimeter of the beds, and these sites are shown on Attachment C.

We originally proposed to take sludge samples at each location by driving 1-1/2 inch PVC casing through the sludge and then pulling the casing out. The sediment inside the casing would be pushed out with a rod on to a plastic tarp. However, because of the consistency of the sludge, it would not enter the PVC casing. This was confirmed by the use of a split-spoon screen. Hand augers were then used to obtain the samples. The samples were placed in a plastic container and brought to EDI Engineering & Science's laboratory. Appropriate chain-of-custody documentation was maintained. Sludge boring log sheets for the 11 sample sites are found in Attachment D.

Leachate was derived from the sludge samples following ASTM Method D 3987-81, Standard Test Method for Shake Extraction of Solid Waste with Water. The leachates from these analyses were analyzed for arsenic, barium, cadmium, chromium, lead, silver, copper, selenium, iron, manganese, mercury, nitrate, pH, and zinc. These parameters were chosen from the list of inorganic parameters which have primary or secondary drinking water standards (40 CFR 141.11 and 143.3) which are found in Attachment E. The leachates were analyzed using Method 200-289 from <u>Standard Methods for the Examination of Water and Wastewater</u>, 15th Edition, APHA, AWWA, GWPCF, 1980, or

Method 303 A-E from Methods for Chemical Analysis for Water and Wastes, USEPA60014-79-020, revised March, 1982. These results are found in Attachment F.

The results of the analyses done on the sludge samples were then compared to the primary and secondary drinking water standards. Based on this comparison, the sludge has been determined not to be inert because the levels of manganese and lead exceed these standards. As a result of these analyses, we will be evaluating our options under Michigan Act 641 and will be in contact with you by the end of July. Please call me or Jim Tolbert if you have any questions.

Lagoon closure?
Capping grading
gw monitoring

Sincerely,

EDI ENGINEERING & SCIENCE

for

Kathryn D. Lynnes
Manager, Regulatory Compliance

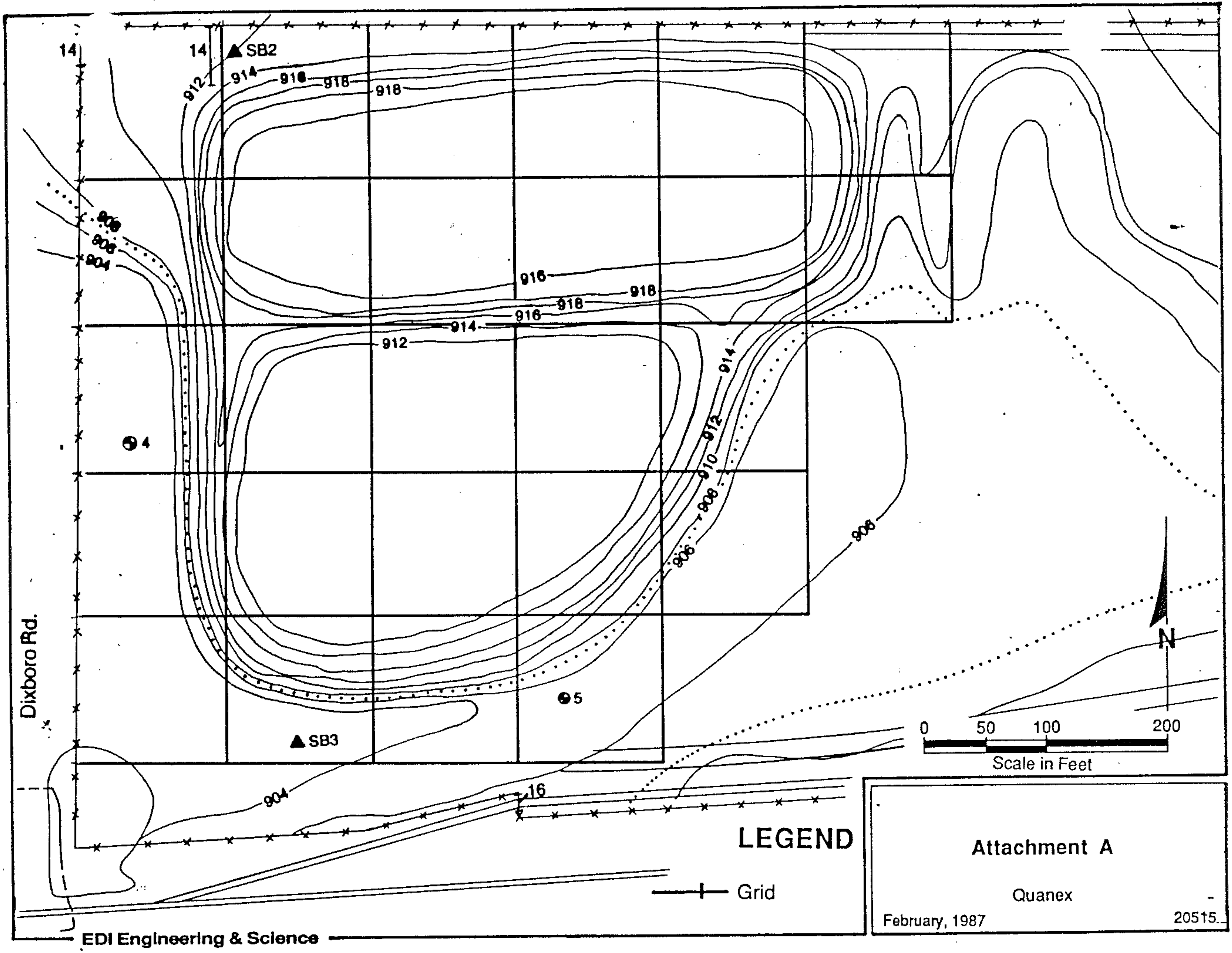
KDL/mck

Enclosures

cc: Don Comfort

ATTACHMENT A

PROPOSED GRID



Attachment A

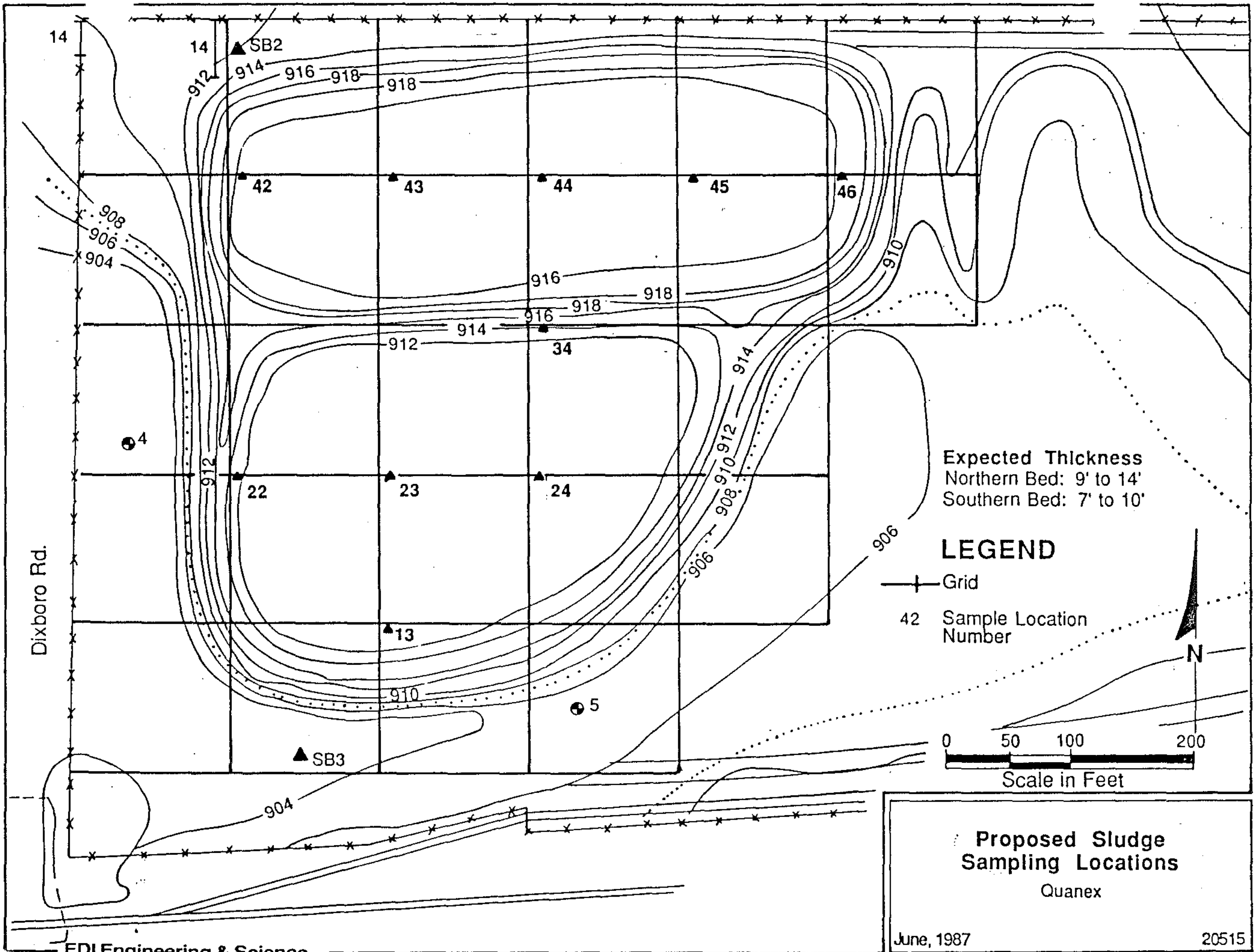
Quanex

February, 1987

20515

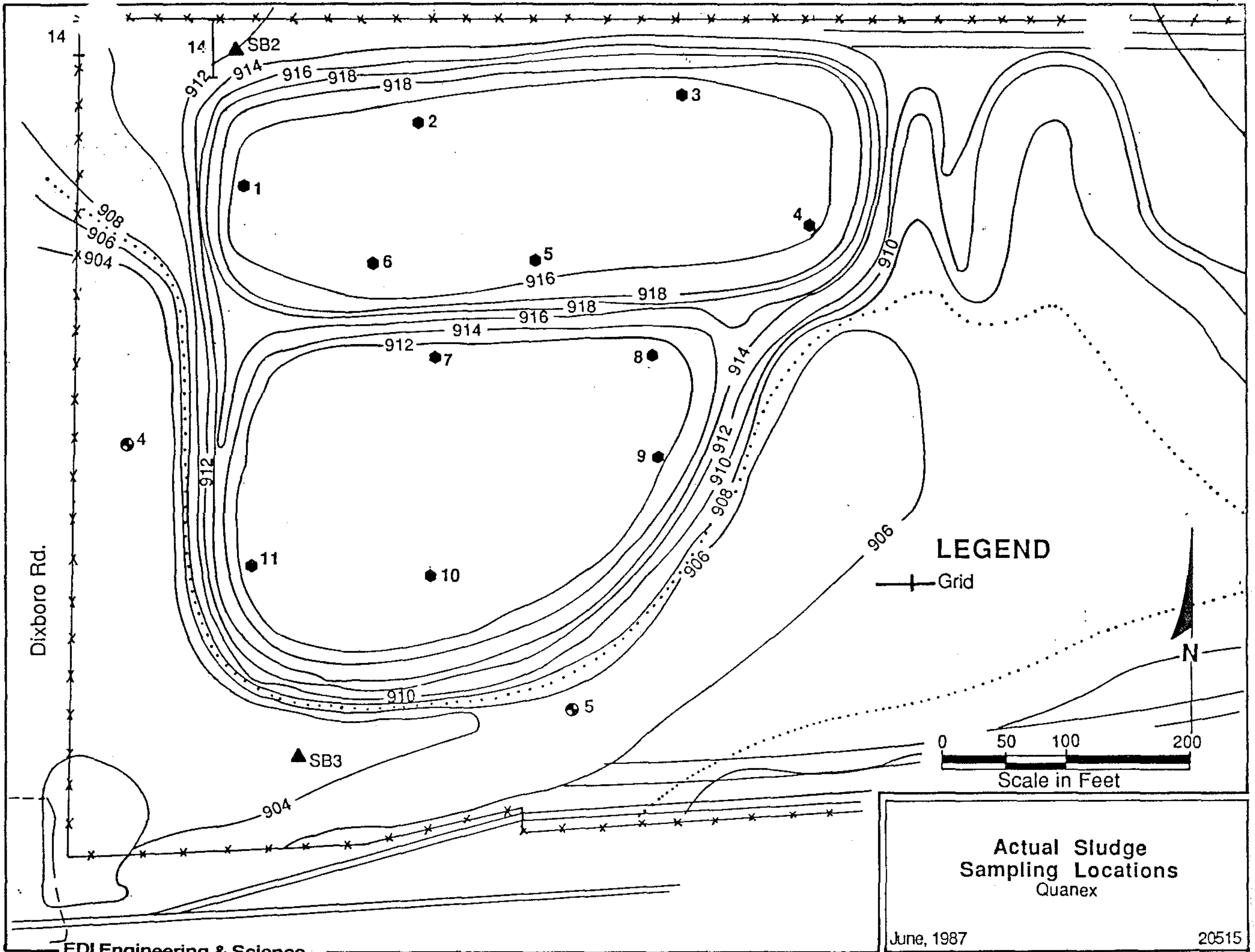
ATTACHMENT B

PROPOSED SLUDGE
SAMPLING LOCATIONS


14
14
SB2
912
914
916
918
918
42
43
44
45
46
908
906
904
916
918
916
918
914
912
34
914
910
4
912
22
23
24
912
910
908
906
906
13
910
5
SB3
904
Dixboro Rd.
Expected Thickness
Northern Bed: 9' to 14'
Southern Bed: 7' to 10'
LEGEND
Grid
42 Sample Location Number
N
0 50 100 200
Scale in Feet
Proposed Sludge Sampling Locations
Quanex
June, 1987
20515
EDI Engineering & Science

ATTACHMENT C

ACTUAL SLUDGE
SAMPLING LOCATIONS



Actual Sludge Sampling Locations
Quanex

June, 1987

20515

EDI Engineering & Science

ATTACHMENT E

PRIMARY DRINKING WATER STANDARDS
(40 CFR 141.11)

ATTACHMENT E

PRIMARY DRINKING WATER STANDARDS
(40 CFR 141.11)

	mg/L
Arsenic	0.05
Barium	1.0
Cadmium	0.010
Chromium	0.05
Lead	0.05
Selenium	0.01
Silver	0.05
Mercury	0.002
Nitrate (as N)	10.0

SECONDARY DRINKING WATER STANDARDS
(40 CFR 143.3)

	mg/L
Copper	1.0
Iron	0.3
Manganese	0.05
pH	6.5-8.5 (pH Units)
Zinc	5.0

ATTACHMENT F

CHEMICAL ANALYSIS OF SLUDGE SAMPLES

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.0.5	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	<0.05	<0.08	<0.05	<0.06	0.21	0.11	<0.05	0.15	0.47	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	0.01	<0.01	0.04	<0.01	0.02	0.02	<0.01	<0.01	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	<0.02	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	----	Stnd. Units

PARAMETER	04/29/87 **BORING 4** Composite *0-8.0'*	04/29/87 **BORING 4** *8.0-9.5'*	04/29/87 **BORING 4** *9.5-10.0'*	04/29/87 **BORING 5** Composite *0-8.0'*	04/29/87 **BORING 5** *8.0-9.2'*	04/28/87 **BORING 6** *1.5'*	04/28/87 **BORING 6** *5.0'*	04/28/87 **BORING 6** *7.5*	04/28/87 **BORING 6** *9.75'*	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.12	0.14	1.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.42	0.29	<0.01	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	<0.02	0.04	0.07	0.05	0.10	0.03	<0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	----	Stnd. Units

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.05	0.21	<0.01	1.0	0.07	<0.01	0.04	0.11	0.08	0.01	mg/L
Zinc	<0.02	0.02	0.02	0.04	0.03	<0.02	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	----	Stnd. Units

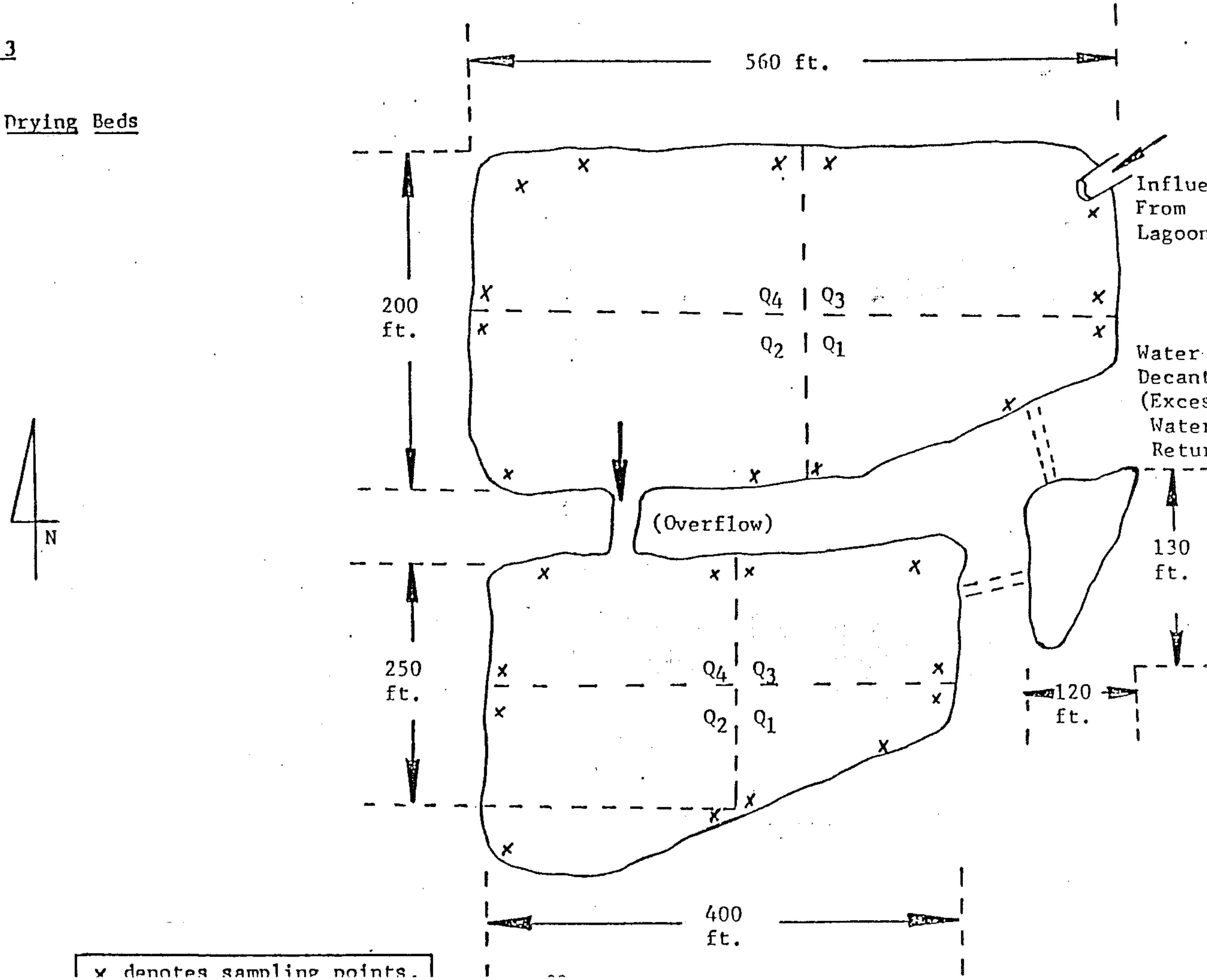
SOURCE: REFERENCE NO. 50

ATTACHMENT C

Previous Analysis on the Sludge

Figure 3

Sludge Drying Beds



x denotes sampling points.

Sampling and Analysis

Sampling and analyses were performed by Hydro Research Services. Sampling took place on October 11, 1982.

Personnel and equipment used in the collection and analyses of samples are presented in the Appendix.

Both lagoons and drying beds were divided into four quadrants each (see Figures 2 and 3). A minimum of 3 core samples were taken in each quadrant and a composite of each quadrant made in a glass jar. Samples were then transported back to the laboratory for analysis.

Samples were then logged in after delivery to the laboratory, assigned a laboratory number, mixed well, and then portioned for analysis.

"As collected" samples from each quadrant in each lagoon were then analyzed for : Total Chromium, Total Cyanide, Lead, and Nickel.

The results of these analyses are presented in Table I.

A composite of equal weights of sample from each quadrant were then made yielding a composite sample for each lagoon and drying bed. These samples were then analyzed for pH and Total Solids. (See Table I for results).

The EP Toxicity procedure was then performed on these composite sludges. The EP Toxicity leachate was analyzed for the following parameters: Arsenic, Barium, Cadmium, Chromium-Total, Copper, Lead, Mercury, Nickel, Selenium, Silver, Zinc, and Total Cyanides. Results of the above analyses are presented in Table II.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Results of Analyses "As Collected" Sludge Samples Date:

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
West Lagoon						
Quadrant 1.	65	2.4	47	<0.5	--	--
Quadrant 2.	200	32	120	<0.5	--	--
Quadrant 3.	68	<2	52	<0.5	--	--
Quadrant 4.	73	3.6	58	<0.5	--	--
Composite	--	--	--	--	26.9	7.5
East Lagoon						
Quadrant 1.	180	4.6	81	<0.5	--	--
Quadrant 2.	160	6.2	90	<0.5	--	--
Quadrant 3.	72	<2	45	<0.5	--	--
Quadrant 4.	160	<2	72	0.6	--	--
Composite	--	--	--	--	29.7	8.0

* All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Date:

Results of Analyses "As Collected" Sludge Samples

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

Results of EP Toxicity Procedure

TO:

Table II

Date:

	West Lagoon Composite	East Lagoon Composite	North Drying Bed Composite	North Drying Bed Composite	Average
Parameters:					
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

Data Analysis

A linear regression analysis was performed on the results obtained from all EP Toxicity leachate parameters analyzed for according to U.S. EPA SW-846, Section 8.49-6.

The results obtained by linear regression on the values of standard concentrations vs. observed concentrations were calculated as a line slope and reported as a percent.

All data obtained were well within specified limits, as few interferences were present.

Discussion/Summary

The results of Table I demonstrate that this sludge is fairly consistent with respect to those elements of concern analyzed for in the "as collected" waste material.

Data presented in Table II clearly show that the lime neutralization process utilized here has been effective in stabilizing this waste material even under EP Toxicity procedure conditions. Although the maximum allowable amount of acid was added during this test, the pH of the leachate did not fall below 6.9.

At no time did the concentrations of those elements of concern exceed EP Toxicity limits and, in most cases, these were below the limits of detection.

In addition, the waste water effluent associated with this waste treatment process has been discharged to local water ways for a number of years. Monitoring data obtained over the last several years under the NPDES permit system (Permit #MI001902) have shown an effluent consistently within permit limitations.

In summary, it has been shown that this sludge does not meet the criteria for which it has been listed as a hazardous waste material and, therefore, it should be delisted.

This delisting will enable the Michigan Seamless Tube Division to more economically dispose of this waste material when the necessity arises for dredging of our lagoons and drying beds.

Appendix I

Sampling and analysis was performed by Hydro Research Services, 408 Auburn Avenue, Pontiac, MI 48058.

I. Sampling

Collection:	Alan Hahn
Dates:	October 11, 1982
Method:	Polycarbonate coring tube.
Storage:	Glass jar.

II. Analytical Procedures

A. Sludge Samples

Metals analyzed followed Methods 8.54, 8.56 and 8.58 of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, US EPA SW-846.

Metals analysis was performed by Cecilia Vernaci and supervised by Linda Deans, General Laboratory Manager.

Total cyanide was determined by Method 335.2, Methods for Chemical Analysis of Water and Wastes, 1979, EPA-600/4-79-020 performed by Nancy Campbell and Susan Scott; supervised by Linda Deans, General Laboratory Manager.

B. EP Methodology

The EP Toxicity was performed according to Section 7 procedures as outlined in US EPA SW-846.

All metals analyzed for were analyzed according to Methods 8.51 through 8.54, and 8.56 through 8.60 of EPA SW-846.

Copper and Zinc analysis followed Methods 220.1 and 289.1, respectively, of Methods for Chemical Analysis of Water and Wastes, 1979, EPA-600/4-79-020.

All metals analyses were performed by Cecilia Vernaci and supervised by Linda Deans, General Laboratory Manager.

Total cyanide was analyzed for according to Method 335.2, Methods for Chemical Analysis of Water and Wastes, 1979.

Appendix I Continued

The EP extraction procedure and cyanide analyses were performed by Nancy Campbell and Susan Scott; and supervised by Linda Deans, General Laboratory Manager.

C. Instrumentation

Atomic Absorption Spectrophotometer:
Instrumentation Labs Model IL-951

UV-Visible Spectrophotometer:
Bausch and Lomb Model 88

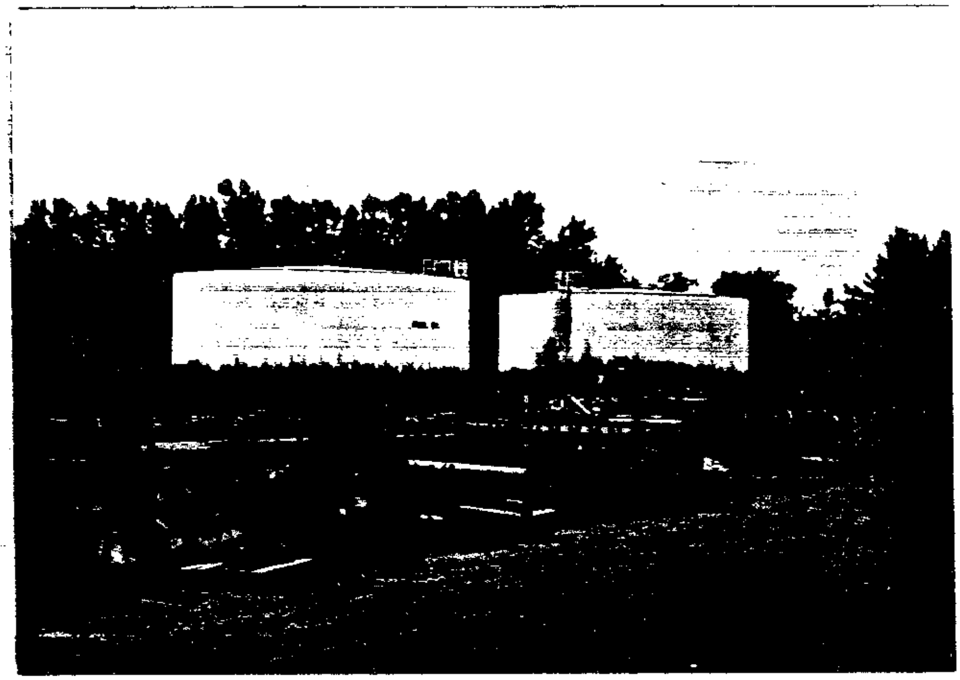
pH Meter
Corning Model 110

D. Personnel Qualifications

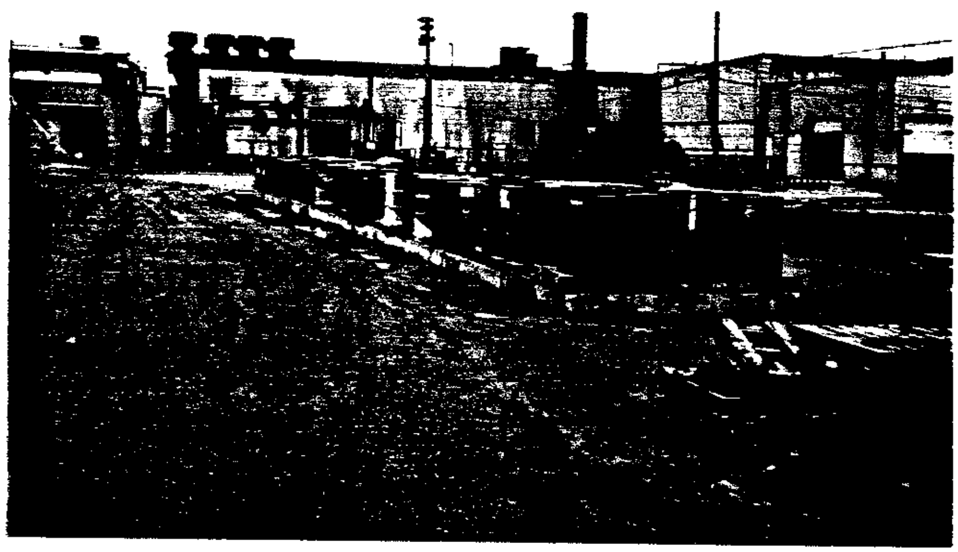
See Appendix II

APPENDIX C

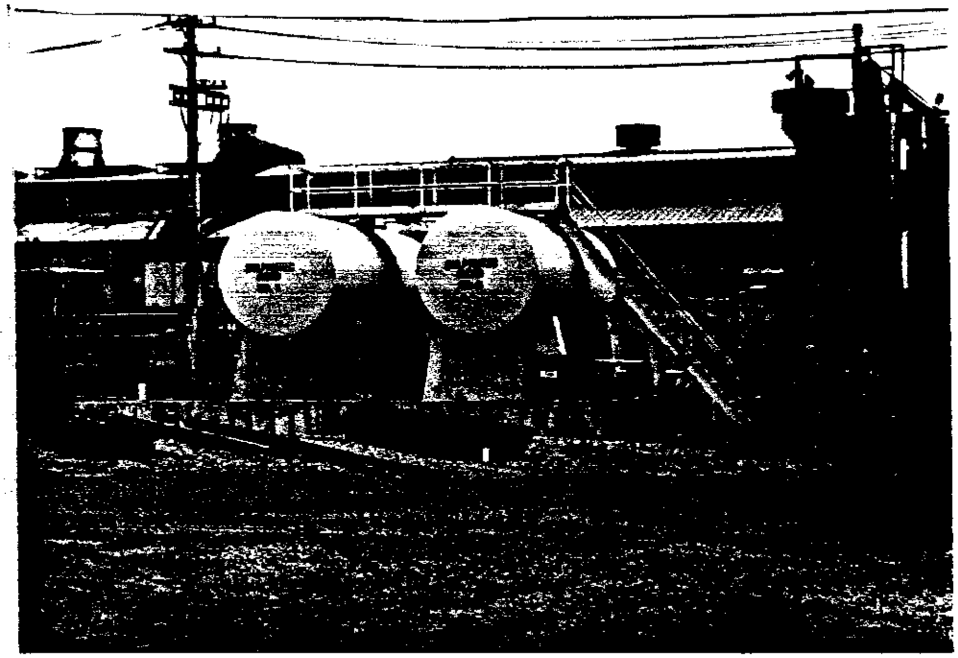
PHOTOGRAPH LOG



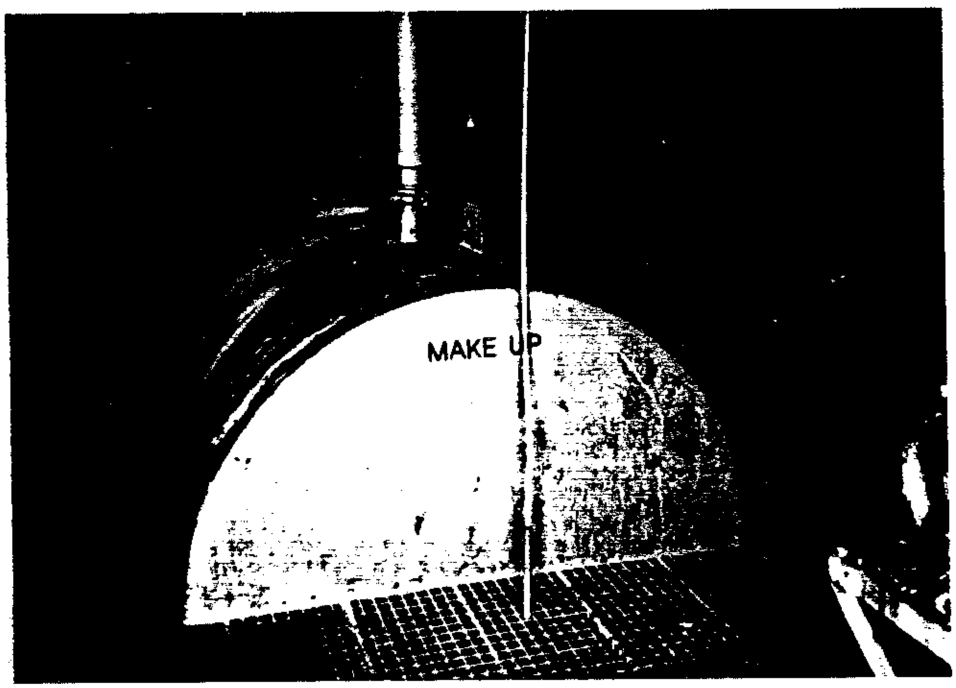
PHOTOGRAPH 1: Fuel Oil Tanks.



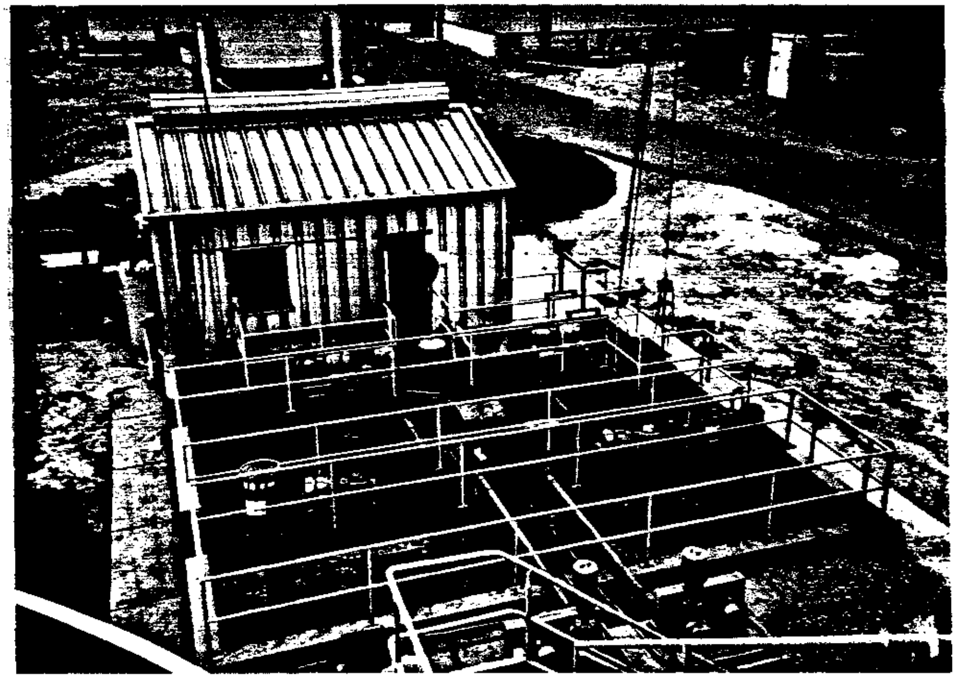
PHOTOGRAPH 2: Oil and Lubricant Drum Storage Area (New/Unused Process Materials).



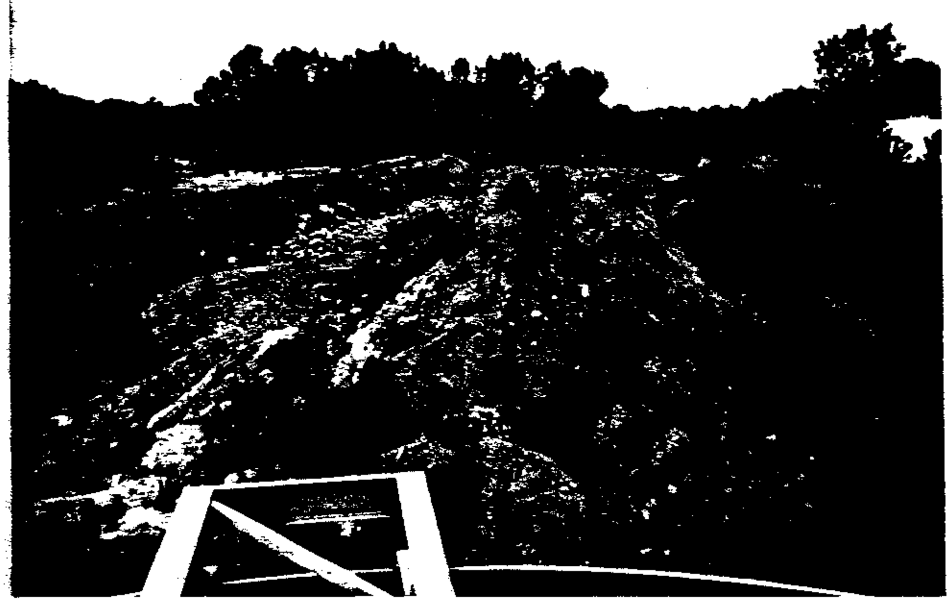
PHOTOGRAPH 3: Sulfuric Acid Storage Tanks.



PHOTOGRAPH 4: Bonderite Storage Tanks.

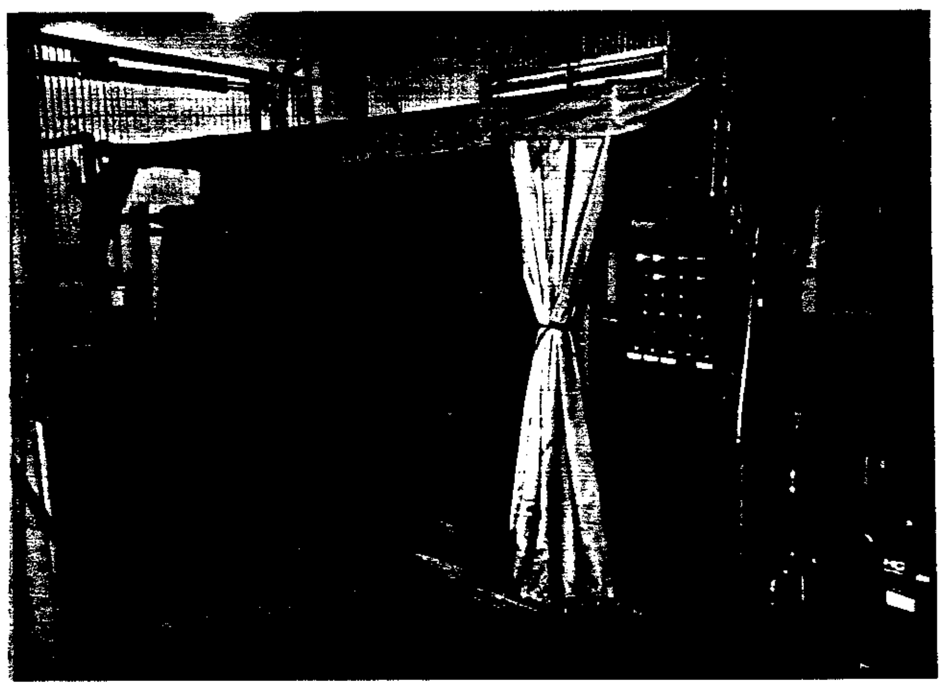


PHOTOGRAPH 5: Neutralization Plant.

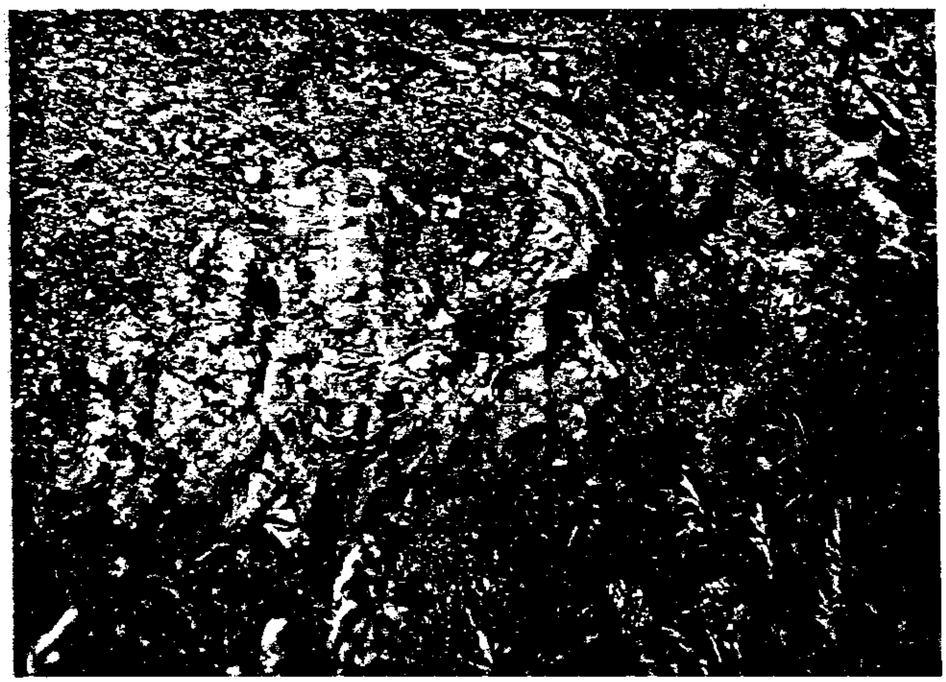


PHOTOGRAPH 6: Surface Impoundments.

PHOTOGRAPH 7: Surface Impoundments.



PHOTOGRAPH 8: Filter Press.

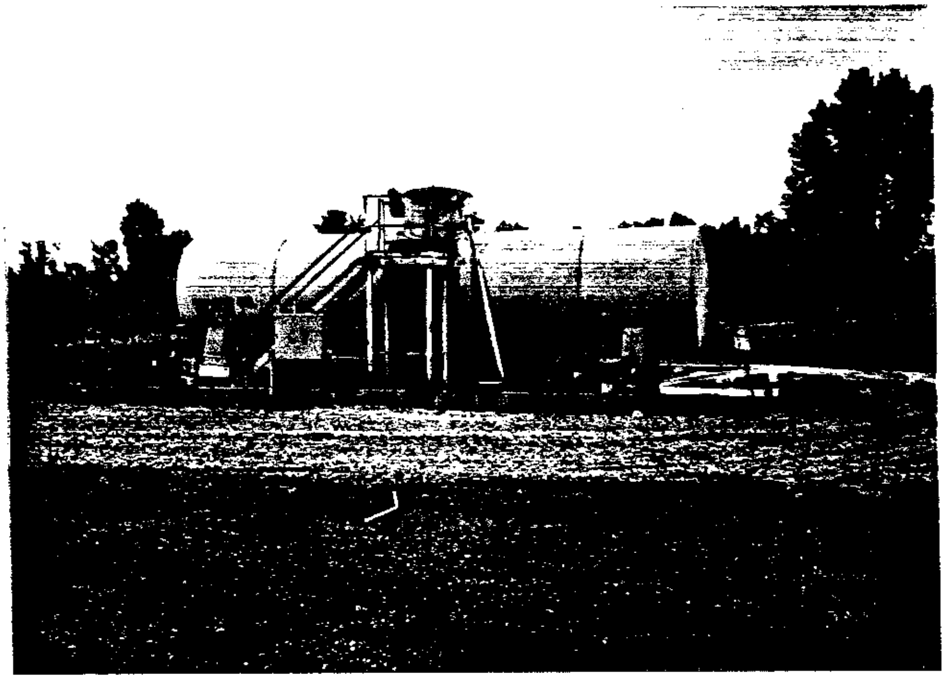


PHOTOGRAPH 9: Uncovered Berm Debris.

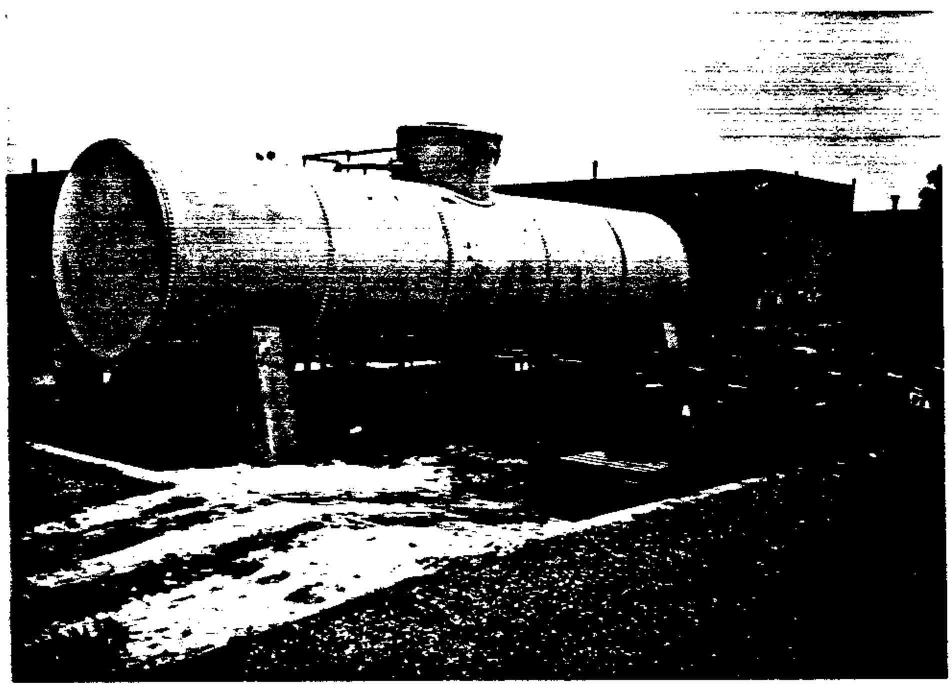
PHOTOGRAPH 10: Uncovered Derm Debris.

PHOTOGRAPH 11: Former HW Storage Area B (clean closed).

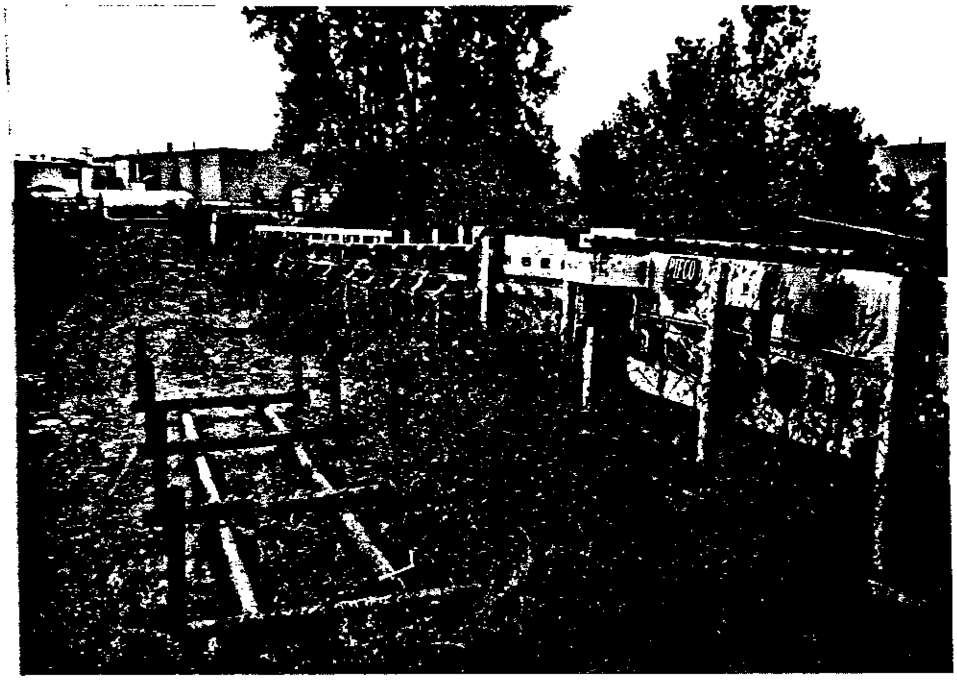
PHOTOGRAPH 12: Empty, clean barrel storage area.



<u>PHOTOGRAPH 13:</u> **Active waste oil storage tank and drums.**



<u>PHOTOGRAPH 14:</u> **Active waste oil storage tank and drums.**

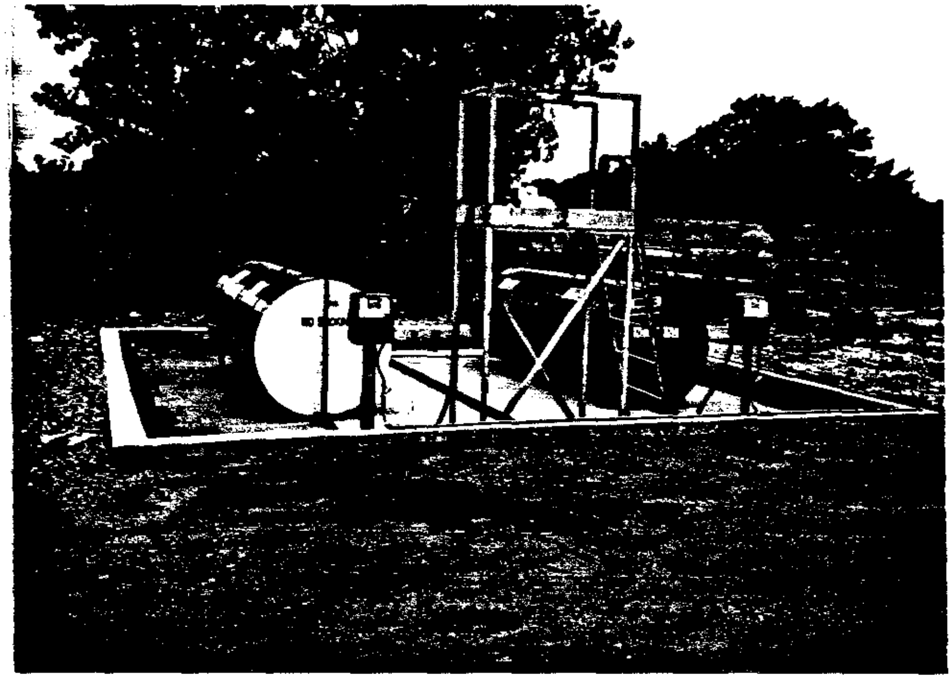


PHOTOGRAPH 15: Former landfill waste pile (scrap equipment storage prior to disassembly and removal).

PHOTOGRAPH 16: Former landfill waste pile.

PHOTOGRAPH 17: Former landfill/waste pile.

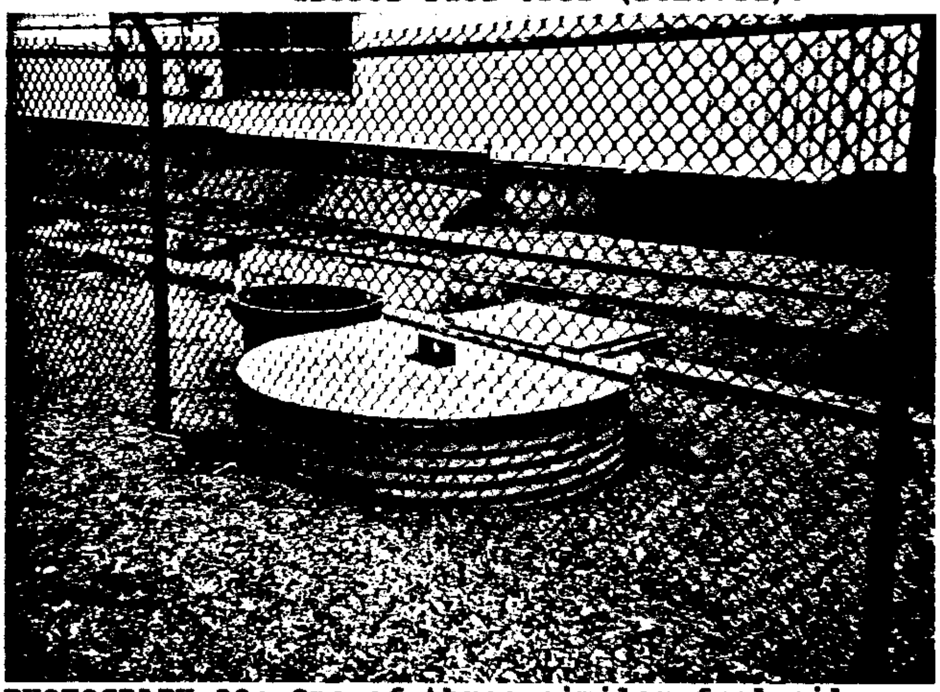
PHOTOGRAPH 18: Surface Impoundment Outfall Culvert to Yerkes Drain.



PHOTOGRAPH 19: New above-grade fuel and gasoline storage tanks.

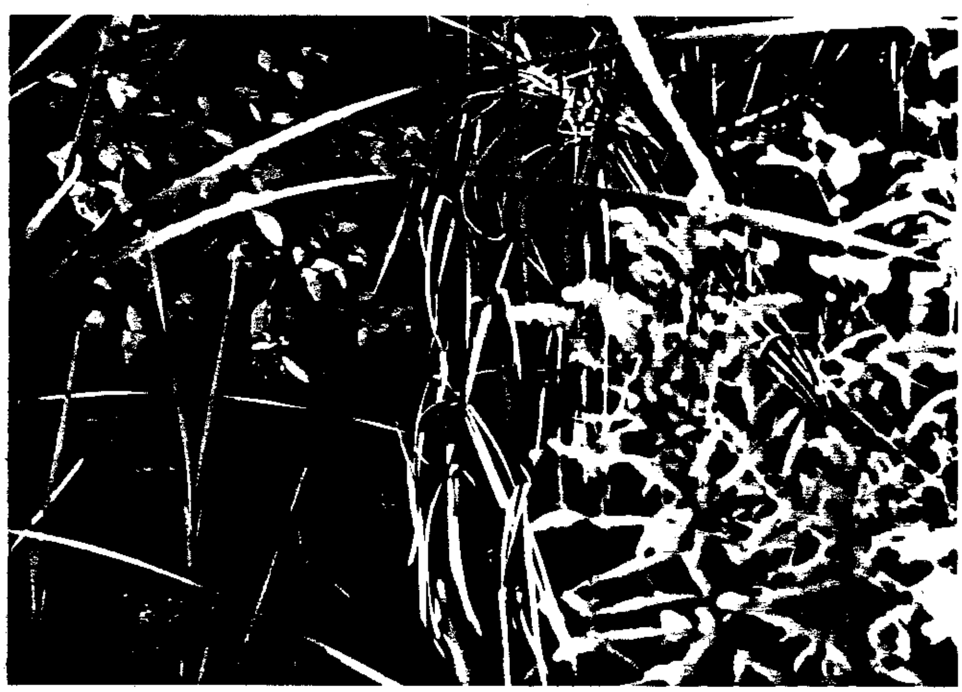
PHOTOGRAPH 20: Previous location of gasoline and diesel fuel USTs (removed).

PHOTOGRAPH 21: Previous location of gasoline and diesel fuel USTs (removed).



PHOTOGRAPH 22: One of three similar fuel oil interceptors for Yerkes Drain.

PHOTOGRAPH 23: Yerkes Drain.



PHOTOGRAPH 24: Plant outfall discharge into Yerkes Drain.

PHOTOGRAPH 25: Northern sludge drying bed.

PHOTOGRAPH 26: Northern sludge drying bed; southern bed is beyond berm shown.

PHOTOGRAPH 27: Absorbant fuel oil boom on Yerkes Drain.

APPENDIX D

VSI FIELD LOG NOTES

9/5/90
TPSKM

Quanex VSI
PR Review Notes

Sect 1.0 – HW Area B has been cleaned to background for barium

Sect. 2.0 – Sludge drying beds are not undergoing closure as they are not regulated, no action is being done or is planned, pending decision on delisting petition

Sect. 2.1 – Sodium stearate is used in conjunction with zinc phosphate

– salt pot waste is non-hazardous since mat'l change from barium, commercial product residues in drum liners are of no longer any concern.

Sect. 2.2 – Prefer "swampy area" name to "wetland" which may imply something which is untrue.

Sect. 2.2.2 – Since the impoundments have not contained liquid for some time, a groundwater mound beneath them may no longer exist.

– 4.5 ft/day seems high, check this number, make sure that it is a flow velocity and not a permeability

Sect. 2.3 – Fuel oil release volume was 280,000 gallons, not 420,000.

Sect. 2.3.3 - 1st sentence may not apply since collection equipt. is in place

Sect. 2.4.3 - Yerkes Drain and <u>Inchwagh Lake</u>

Sect. 2.5 - Four pickle tanks have fan ventilation and two share a scrubber, there are six annealing furnaces now and the burners are actually boilers. Note that the boilers are natural gas run and oil is only kept on line in case of an emergency. Also have 2 reheat furnaces, a rotary and walking-beam furnaces, which share one stack.

Sect. 2.5.2 - No testing has been found to be necessary, no complaints, only testing which would be done is if an emission problem was visual.

Sect. 2.6 - Seeping from HW Area B is speculation only, the closure testing proved otherwise.

- S.D. Beds & impoundment sludge constituents are immoble, check & verify this release info!

Sect. 2.6.1 - HW storage Area B was certified closed by MDNR on 2/5/90.

- impoundments are inactive & stabilized

2.6.1 (cont.). - and therefore practically closed but not "officially" certified closed.
- former acid pits may have contained treated K062 wastes as did surf. impoundments.
- surf. impoundments have not been cleaned up, just stabilized

Sect. 2.6.2 - Make a <u>very</u> clear distinction between what was found in the soil and what was found in the sludge.

Sect. 2.7.1 - No source existing

Sect. 2.7.2 - No monitoring since no source

Sect. 3.1 - State certified as Type III (?) & not inert

Sect. 3.1A - Impoundments were used for retention but not make for that purpose. Sludge depth in finishing lagoon ≈ 3' and in roughing lagoon ≈ 7'-14'.

Sect. 3.1C - K063 waste type was proposed only, never official
- delisted in 1985 or 1984? check
- Volume approx 46900 CY after stabilization.
- Constituents - LSWPLS, be <u>very</u> careful as the word "constituents" implies something which may not be true with LSWPLS immobilized contaminants

rephrase

Sect. 3.1D - release gate/decant structure
- clay liner may have been used (was in constrction plans).

Sect. 3.1E - why are normal operations considered a release?

Sect. 3.2 - Not undergoing closure
- Type III Desig. Petition is pending still.

Sect. 3.2A - sludge depth in the southern bed may be less than 9'

Sect. 3.2C - K063 was proposed only
- no flyash stabilization was done here
- 55,000 cy may be low
- rework with new understanding of constituent considerations

Sect. 3.3 - pits have been buried during plant expansions

Sect. 3.3A - check dimensions, actual are unknown

Sect. 3.3B - Pits may have been ~~ue~~ constructed from east to west as the plant expanded until finally the impoundments were constructed.

Sect. 3.3C - LSWPLS (neutralized acid with lime).

Sect. 3.3E - GW monitoring shows no releases

Sect. 3.4 - eliminated, not a SWMU or Area of Concern

Sect. 3.5 - Not a debris pile, just debris
- waiting for approval of a work plan
Sect. 3.5 A - historic staging area for scrap.
Sect. 3.5C - 30-40 feet long, not 180 feet
Sect. 3.6 B - B: 1985-89
C: 1980 - present
Sect 3.6 C - B: only barium & corrosives, short
term (one time only), ≈100 gal Ba (3 drums
C: waste oil; 10,000 gal tank
Sect. 3.6 D - 150% containment
Sect. 3.6 E - No releases from either.
Sect. 3.7 - Remove from report
Sect. 3.8 - USTs removed 10/88 under
LUST program, remove
Sect. 3.9, 3.10, 3.11, 3.12, 3.13 & 3.15 → remove
from report, process areas not SWMUS.
Sect. 3.14A - mill bldg, not main office
Sect. 3.14C - 280,000 gallons, not 420,000
Sect. 3.15 → filter press sludges shipped
to Type II landfill.

5 Sept 90

1. HW Container Storage Unit Closure approved by MDNR. Q will send ~~letter.~~ → Given copy during mtg.

2. Sludge drying beds do not have a closure plan. Q is trying to get Type II designation.

3. WW flow is 1 MGD.

4. Sodium sterate is used in addition to zinc phosphate.

5. Residents have city water. Groundwater wells for watering purposes.

6. Spill was between 0.1 280,000 - 420,000 gallons
Send File

7. Section 2.3.1 Q waiting for cleanup approval for debris located in surface impoundment.

8. Old NPDES permit has been extended. New permit has been applied for that will reduce discharge & increase concentration.

9. Surface impoundments have been treated with lime to stabilize.

10. Not a debris pile. (2.6)

11. Storage pad has been closed & certified.

12. (2.6.1) Closed but certification is pending.

13. (2.6.1) Spent pickle liquor can release zinc, chromium & lead.

14. (2.6.2) Clarify to specify where contaminants come from. (Soil & Sludge)

15. (3.1 Surface Impoundments) MDNR approved material as Type III ~~10 to 15 feet deep~~
K063 was proposed number only
Lime stabilized pickle Liquor. sludge.
Gate was used to release effluent, Clay line

16. (3.2 Sludge Drying Beds) ~~Closure pending~~ Closure not required because sludge is Type III.
Same but has not been solidified.
May Remove.

17. (3.3 Acid Pits) Nuetralized w/ lime. May have been excavated. during construction.
Lime stabilized pickle liquor sludge.

18. 3.4 (Former Landfill / Wastepile)
Retired equipment

NPDES Permit

19. (3.5 Uncovered Debris Pile)

20. (3.6 Former HW Container Storage Facilities)

21. 3.8 Contaminated soil removed.

CHECK W/ GARY ABOUT REVIEW

Call Mr. Comfort.

M&E
TPSKI
9/5/90

Quanex Corp- MST Photolog

Picture No.	Description
8	Fuel Oil Tanks
9	Oil & Lubricant Drum Storage
10	Sulfuric Acid Storage Tanks
11	Bonderite Storage Tanks
12	Neutralization Plant
13 & 14	Surface Impoundments
15	Filter Press (2 in place, one not photographed)
16 & 17	Uncovered Berm Debris
18	HW Storage Area B (former loc.)
19	Empty barrel storage area adjacent to Area B
20 & 21	Area C-HW Storage Area, Waste Oil tank & drums (note sump).
22, 23 & 24	Retired equipt. & scrap metal area
25	outfall drainage & culvert to Yerkes Drain
26	New above-grade fuel oil & gasoline tanks (replaced USTs which were removed in another location).
27 & 1 (New roll)	Former location of USTs for fuel oil & gasoline (removed under LUST program).

9/5/90

Photo	Descript.
2	Fuel oil interceptor/collection equipt. near Yerkes Drain
3	Yerkes Drain
4	Outfall into Yerkes Drain from plant property
5	Northern-most sludge drying bed
6	North drying bed, south bed is just beyond berm shown.
7	Absorbant oil boom on Yerkes Drain

APPENDIX E

FACILITY FILE: SAMPLING RESULTS AND MONITORING DATA

SOURCE: REFERENCE NO. 1

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

RECEIVED
FEB 22 1989
WASTE MANAGEMENT DIV.

February 9, 1989

Mr. Donald Comfort, P.E.
Engineering Manager
Quanex Corporation
Michigan Seamless Tube Division
400 McMunn Street
South Lyon, Michigan 48178

Dear Mr. Comfort:

Subject: Closure of Surface Impoundments
Quanex Corporation, Michigan Seamless Tube Division
MID 082 767 591

The Waste Management Division (WMD) of the Michigan Department of Natural Resources (MDNR) has reviewed the information that Quanex Corporation submitted on February 3, 1989, regarding the surface impoundments at the facility. Based on a review of the lime stabilized waste pickle liquor sludge (LSWPLS) analytical results, the WMD hereby approves the Type II waste classification for the LSWPLS. Quanex Corporation may excavate down to the soils that underlay the roughing and finishing surface impoundments only, and must dispose of the LSWPLS from the surface impoundments at a licensed Type II solid waste management facility. If you contemplate disposing of this material at a facility located outside of Oakland County, you must first contact the receiving county's Solid Waste Planning Agency to verify that disposal of out-of-county waste is allowed under the county's solid waste management plan.

The soil and sludge containing debris that is located in the impoundment berms must be left in place, pending MDNR authorization for proper disposal. Any soil and sludge containing debris that is encountered during further excavation of the LSWPLS from the roughing and finishing surface impoundments must also be left in place.

Quanex Corporation must notify Waste Management Division Detroit District staff (313-344-4670) and Lansing Hazardous Waste Permits Unit staff (517-373-2730) at least two days prior to the initiation of sludge excavation and removal.

If you have any questions, please contact Ms. Ronda L. Hall of my staff at 517-373-9548.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-2730

cc: Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Kenneth Burda, DNR/C&E File
Ms. Ronda L. Hall, DNR
Ms. Lynne King, DNR

SOURCE: REFERENCE NO. 3

x. Permit

Quanex Corporation
Michigan Seamless Tube Division
400 McMunn
Sc von, Michigan 48178
(3 -8117

SEP 15 1989

Quanex Michigan Seamless Tube Division

September 14, 1989

Ms. Catherine Schmitt
Environmental Quality Analyst
Southeast Michigan Field Office
Surface Water Quality Division
Michigan Department of Natural Resources
505 W. Main St.
Northville, Michigan 48167

RE: Your Letter of August 22, 1989, Notice of Non-Compliance
Quanex MI 0001902

Dear Ms. Schmitt:

First of all, I apologize for my failure to submit a written explanation of our non-compliance for the incidents cited in your letter of August 22, 1989. This was due to my misconception that minor variances of one or two days out of the month did not require a written explanation.

During the month of January (which is one of the months cited in your letter) I did submit a written explanation attached to the MDR. I did so because we were consistently out of compliance for a significant period during the month and felt it required an explanation. I have attached a copy of that letter for your review.

The February 8 letter addresses the primary source of additional solids introduced to the system which periodically put us out of compliance. We try to stagger these cleanings as well as the release of spent pickle liquor in order to minimize the degree of fluctuation in solids content. Occasionally, however, operations personnel, and there are several involved, fail to regulate the tank discharge properly or sometimes production associated problems contribute to abnormally high usage of the materials contributing to the solids i.e., zinc and phosphorus and the result, unfortunately, is non-compliance. The out-of-compliance period is seldom more than one day per month and is rarely, if ever, longer than one day or more than 30 to 40% over specification as delineated below.

<u>Violation Incidents</u>

<u>December, 1988</u>

Dec. 8 Suspended solids qualitative over 21%
Dec. 19 Suspended solids quantitative over 30%

<u>January, 1989</u>

Please see attached letter dated February 8, 1989

<u>February, 1989</u>

February 13 Suspended solids qualitative over 30%
February 13 Suspended solids quantitative over 14%

<u>March, 1989</u>

March 20 Suspended solids qualitative over 37%
March 20 Suspended solids quantitative over 27%
March monthly average phosphorus qualitative over 8%

<u>May, 1989</u>

Monthly average phosphorus qualitative over 12%

<u>June, 1989</u>

Monthly average phosphorus qualitative over 20%

<u>August</u> as submitted September 8 (not included in your letter)

August 7 Suspended solids qualitative over 17%

I can certainly understand your concern over our non-compliance in view of our past record of practically never being out of compliance and I'm sure that it must appear to be flagrant disregard of our responsibility, because of our ability to be within compliance year after year. Let me assure you that this is not the case and if anything we are much more cognizant of all the factors affecting the process than ever. As you know, we were forced to abandon our impoundments in October of 1988. At this time, we installed claricones and filter presses to replace the impoundments. Previously if we were out of compliance for one day the effluent remained on our property in a 5 million gallon mixing zone, so to speak, for approximately 5 days and was well within specification before discharge. However, with our present system, it is discharged immediately. Moreover, the laboratory sample is analyzed the day after discharge which makes it impossible to correct quality problems on less than a one day cycle, with the exception, of course, of quality problems that can be determined visually. Similarly, under our previous system, we had three to four days to correct a problem within the lagoon system if necessary after receiving the lab analysis of the sample.

Another factor contributing to our qualitative problems is the fact that our volume of flow is down considerable through our new system due to capacity limitations of our clarifiers. Our process solids are the same per ton of steel produced as before so we simply have the same volume of non-captured solids being discharged in a smaller volume of water.

Please let me assure you that we are doing everything possible to tighten the control over the influences upon our water quality. We are still improving our polymer system in an effort to capture more of the solids.

Hopefully the foregoing will be sufficient explanation of the permit violations cited in your letter. In the future, I will submit a letter of explanation for all incidents of non-compliance regardless of the magnitude or frequency, if you so desire.

Sincerely,

QUANEX CORPORATION
Michigan Semaless Tube Division

W. V. Merchant
Plant Engineer

cc: Mr. Roy Schrameck, District Supervisor
J. J. Yetso
C. D. Simpson
D. F. Comfort
L. E. Ledbetter
R. E. Misslitz

Attachment: Copy of letter dated February 8, 1989

SOURCE: REFERENCE NO. 6

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF:

Quanex Corporation

NPDES PERMIT NO: MI0001902
NNC No. NC-08-89-05-021D

NOTICE OF NONCOMPLIANCE

TO: Quanex Corporation
400 McMunn
South Lyon, Michigan 48178

Attention: Mr. W. V. Merchant, Plant Engineer

PLEASE BE ADVISED that we have sufficient information to believe that the Quanex Corporation has failed to comply with the terms and conditions of their National Pollutant Discharge Elimination System (NPDES) Permit No. MI0001902.

PURSUANT to the terms of the NPDES Permit (Part I, Section A.1 Effluent Limitations and Monitoring Requirements) the discharge from your facility, to the Yerkes Drain via Outfall 001, is limited for the following parameters:

Discharge Limitations

Effluent Characteristics	Daily Maximum	Monthly Average
Total Suspended Solids	30 mg/l 270 lbs/day	20 mg/l 110lbs/day
Total Phosphorus	--------	0.25 mg/l 2.3 lbs/day

FURTHER, PURSUANT to the terms of the aforementioned permit (Part II, Section A.1 Duty to Comply) all discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of that authorized, shall constitute a violation of the permit.

BE ADVISED that the Quanex Corporation has had several violations of their NPDES Permit as indicated in your facility's Discharge Monitoring Reports. The violations are as follows:

VIOLATION DATE	PARAMETER	REPORTED VALUE
December 1988	Suspended Solids	39.00 mg/l 326.93 lbs/day
	Total Phosphorus	0.28 mg/l
January 1989	Suspended Solids	39.00 mg/l 292.73 lbs/day
	Total Phosphorus	0.41 mg/l
February 1989	Suspended Solids	39.00 mg/l 309.00 lbs/day
	Total Phosphorus	0.28 mg/l
March 1989	Suspended Solids	41.00 mg/l 341.94 lbs/day
	Total Phosphorus	0.27 mg/l
May 1989	Total Phosphorus	0.28 mg/l
June 1989	Total Phosphorus	0.30 mg/l

IT IS THEREFORE DIRECTED that the Quanex Corporation immediately return to compliance with the requirements of the NPDES permit.

IT IS FURTHER DIRECTED that the Quanex Corporation submit a written report to the Surface Water Quality Division District Office on or before September 18, 1989. This report must include:

1) A detailed explanation of the reason for the violations cited above.

2) An explanation of the steps that will be implemented to prevent future NPDES permit violations.

PLEASE BE ADVISED that further administrative remedies will be instituted for continued failure to comply with the terms of your NPDES permit or this notice.

WATER RESOURCES COMMISSION
DEPARTMENT OF NATURAL RESOURCES

Date Issued: August 22, 1989

Roy E. Schrameck

Roy E. Schrameck, Supervisor
Surface Water Quality Division
Northville District Office

ADDRESS FOR FURTHER CORRESPONDENCE

Catherine J. Schmitt

Catherine J. Schmitt
Environmental Quality Analyst
Surface Water Quality Division
505 W. Main Street
Northville, Michigan 48167

cc: Frank Baldwin/Val Harris, Compliance and Enforcement
File-Quanex Corporation

SOURCE: REFERENCE NO. 19

A list of constituents which were measured above the mean background level and above their detection limit during the third quarter of 1988 are listed below by well. Due to the low calculated mean background values, most of the constituents measured above their detection limits are automatically above their mean background value.

WELL NUMBER	*MEASURED CONSTITUENT*	*CONCENTRATION*
6A	*1,1-dichloroethane	42 ppb
6A	*arsenic	7.9 ppb
11A	*1,1-dichloroethane	3.7 ppb
11B	1,1-dichloroethane	3.0 ug/l
11B	arsenic	4.0 ug/l
11D	arsenic	6.3 ppb
12B	arsenic	7.1 ug/l
13B	arsenic	5.4 ug/l

Constituents with an asterisk (*) in front of them were also above the mean of the background data during the second quarter 1988 sampling. Analyses of these constituents are statistically compared to background in Attachment F of this letter, and will be discussed later. The other five constituent well pairs will be resampled three times. This sampling is currently scheduled for November 7, 1988. Data from these samples will be combined with this data from the third quarter of 1988 to statistically compare the current concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Ground Water Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the second quarter of 1988 was above the mean background concentration, and above the detection limit, and if that parameter was not compared to background data in the second quarter, then that well was sampled three times during this quarterly sampling. The three resulting samples were each analyzed for the specific detected constituent. The results of these analyses along with the data from the previous quarter are presented in Attachment D. Only the first of the three new samples is reported in the overall analytical results in Attachment B.

Attachment E includes the five statistical comparisons of the downgradient samples to the background data from well 1. The statistical test that is used checks the the null hypothesis:

SOURCE: REFERENCE NO. 20

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

AUG 24 1988

RECEIVED
AUG 25 1988
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V.

MID 082767591

Mr. Donald Comfort
Engineering Manager
Quanex Corporation
400 McMunn Street
South Lyon, Michigan 48178

Dear Mr. Comfort:

The Permits and State Programs Division has completed a review of your February 5, 1986 petitions (#0633A and #0633B) which request the exclusion of the liquid portion of your treatment plant effluent, classified as EPA Hazardous Waste No. K062. At your request, your original petition (#0633) was divided into two parts subsequent to its submittal. The K062 treatment plant effluent was made the subject of petition #0633A, and two surface impoundments containing the K062 treatment plant effluent were made the subjects of petition #0633B. Based on the evaluation of ground-water monitoring data received from State and EPA Regional authorities and collected during the Delisting Program's spot-check sampling visit (August 26, 1987) to your facility, we will recommend to the Assistant Administrator for Solid Waste and Emergency Response that both petitions be denied.

In order for EPA to grant an exclusion, the Agency must determine that a petitioned waste will not pose a significant threat to human health and the environment. We believe that assessing the potential for hazardous constituents to migrate from the waste into the environment is necessary to our determination. While we typically use models in this assessment, we believe ground-water monitoring data from an adequate well system provides important additional information regarding a petitioned waste's impact on the environment.

After reviewing ground-water monitoring results for wells that monitor the two surface impoundments, we determined that the wastes contained in the surface impoundments (*i.e.*, the subject of petition #0633B) may be contributing to ground-water contamination. Specifically, ground-water samples collected from wells that monitor the surface impoundments contained

Van Marshall
513-449-6357

hazardous constituents at concentrations exceeding the health-based levels used in delisting decision-making[1/]. Lead, chromium, and trichloroethene were detected in EPA spot-check samples from downgradient wells at the Quanex facility, while lead, selenium, and 1,1-dichloroethane were detected in ground-water samples collected by Quanex. One ground-water sample collected by the Michigan Department of Natural Resources also documented the presence of 1,1-dichloroethane in the ground water at a downgradient well. The ground-water monitoring data of concern are presented in Enclosure I.

In addition, you have indicated that the surface impoundments received the K062 treatment plant effluent (i.e. the subject of petition #0633A). Therefore, we believe that the petitioned treatment plant effluent, which has been managed in the on-site surface impoundment, may have also contributed to the ground-water contamination documented at this facility. As such, we feel that it would be inappropriate to grant an exclusion for a waste which has been shown to have the potential to adversely affect ground water.

Based on our consideration of the ground-water monitoring data from this facility, we do not believe that this data adequately supports an exclusion, and so we will recommend to the Assistant Administrator that proposed denial decisions for these petitions be published in the Federal Register.

It is our practice to give petitioners the option of withdrawing their petitions to avoid publication of a negative finding in the Federal Register. If you prefer this option, you must send us a letter within two weeks of the date of receipt of today's correspondence, withdrawing your petitions and indicating that the petitioned wastes are considered hazardous and will be managed as such. This letter should be forwarded to:

Mr. Jim Kent
U.S. Environmental Protection Agency
Office of Solid Waste, Mailcode OS-343
401 M Street, S.W.
Washington, D.C. 20460

If you choose not to withdraw your petitions, we will recommend that a denial notice be published in the Federal Register.

1/ See "Docket Report on Health-based Regulatory Levels and Solubilities Used in the Evaluation of Delisting Petitions," June 8, 1988, located in the RCRA public docket.

If you have any questions regarding our decision, please contact Mr. Scott Maid of my staff at (202) 382-4783.

Sincerely,

Bruce R. Weddle, Director
Permits and State Programs Division

Enclosure

cc: Wayde Hartwick, Region V
Allen Debus, Region V
Bill Miner, Region V
Dave Slayton, MDNR
Jenny Utz, SAIC
Jim Kent, EPA HQ
Scott Maid, EPA HQ

(#0633b) -- Selected Ground-water Monitoring Data

Parameter	Health-Based Level	Well #	Concentration (mg/l)	Date Sampled
1-Dichloroethane	0.00038	1*	<0.002 (upgradient)	
		11A	0.006	10-17-86 (Q)
			0.003	5-18-87 (Q)
			0.0099/0.0052/0.0047**	8-18-87 (Q)
			0.0041	11-12-87 (Q)
			***/0.0018/<0.0010**+	2-10-88 (Q)++
		11B	0.006	10-17-86 (Q)
			0.004	3-11-87 (Q)
			0.0021/0.0022/0.0023**	5-18-87 (Q)
			0.0061	8-18-87 (Q)
			0.0053/0.0055/0.0052**	11-12-87 (Q)
			0.0040	2-10-88 (MI)
			0.0035	2-10-88 (Q)
		14A	0.0011	8-18-87 (Q)
			0.0012/0.0014/0.0011**	11-12-87 (Q)
			0.0012	2-10-88 (Q)++
		14B	0.0011	8-18-87 (Q)
Lead	0.05	1*	0.02 (upgradient)	6-20-84
		2	0.06	9-27-84 (Q)
		11A	0.11	8-26-87 (EPA)
		15A	0.22	8-26-87 (EPA)
		16A	0.14	8-26-87 (EPA)
Chromium	0.05	1*	0.005 (upgradient)	3-14-84
		15A	0.090	8-26-87 (EPA)
		16A	0.13	8-26-87 (EPA)
Selenium	0.01	1*	0.0024 (upgradient)	2-10-88 (dissolved)
		2	0.017	9-27-84 (Q)
		12A	0.010/0.011/0.011**	2-10-88 (Q)
Trichloroethene	0.005	1*	<0.002 (upgradient)	
		16A	0.0069	8-26-87 (EPA)

(EPA) -- EPA Delisting Spot Check Data
(MI) -- Michigan Department of Natural Resources (MDNR) Data
(Q) -- Quanex Data
* -- Maximum values from Well #1, the upgradient well, shown for comparison.
** -- Values represent results of replicate analyses.
*** -- Sample vial broke during log-in.
\+ -- Average of replicate samples exceeds delisting health-based level
++ -- MDNR value <0.0010

SOURCE: REFERENCE NO. 22

ATTACHMENT B

ANALYTICAL RESULTS FROM FIRST QUARTERLY SAMPLING IN 1988

QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISION

SAMPLED ON FEBRUARY 10, 1988

(Metal analyses for monitoring well 14A and 16A sampled on 2/17/88

due to defective filter during initial sampling)

	Units	Detection Limit	Well 1	Well 11-A	Well 11-B	M.W. 11-D	M.W. 12-A	M.W. 12-B
1,1-Dichloroethane	ug/l	1	<1	**	3.5	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	2.1	4.0	6.0	<2.0	8.0
Barium	mg/l	0.1	0.31	0.47	0.32	0.34	0.15	0.27
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	ug/l	2.0	2.4	<2.0	<2.0	<2.0	10	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	1,745	1,758	1,676	859	1,212	1,550
pH (field)	standard	NA	7.32	7.57	7.42	7.43	7.66	7.41

	Units	Detection Limit	M.W. 13-A	M.W. 13-B	M.W. 14-A	M.W. 16-A	Field Blank	Trip Blank
1,1-Dichloroethane	ug/l	1	<1	<1	1.2	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	5.5	6.6	<2.0	<2.0	<2.0
Barium	mg/l	0.1	0.57	0.26	0.26	0.32	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0,05
Selenium	ug/l	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	2,161	1,799	1,714	1,638	NA	NA
pH (field)	standard	NA	7.15	7.25	7.28	7.37	NA	NA

< - Not detected at the indicated detection limit.

NA - Not analyzed.

* - Temperature adjusted.

** - Sample vial broken upon log-in.

MICHIGAN DNR

FEB. 10, 1988

Quanex Corp. South Lyons MID 082 767 591

Parameter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic		<0.002	0.0034	0.004	<0.002	0.004	0.0066	<0.002
Barium		0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium		365	374	334	497	391	306	<1
Cadmium		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron		3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium		7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium		32.2	34.2	37.5	78	53	19.7	<1
Manganese		0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium		84.1	61.3	61.9	61.1	54.6	73	<1
Nickel		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Field Conductivity	umhos/cm	1880	1720	1680	2200	1645	1660	—
Field pH	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	< 2.0
	ug/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT

HT - The recommended maximum laboratory holding time was exceeded before analysis.

See attached list for organic scan parameters and detection limits.

MDNR samples from 2/10/88 split sampling with Quanex. Samples analyzed at DNR lab.

Comparison of DNR and Company (EDI) Lab Results
Quanex Corp. - Feb. 10, 1988

		1,1 DCE	As	Ba	Cd	Cu	Cr	Pb	pH	Conduct.
		ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU	umhos/cm
MW-1	DNR	K1.0	K2.0	0.034	K0.02	K0.02	K0.05	K0.05	6.50	1,830
	EDI	K1.0	K2.0	0.310	K0.01	K0.01	K0.05	K0.05	7.32	1,745
MW-11A	DNR	K1.0	3.4	0.072	K0.02	K0.02	K0.05	K0.05	6.80	1,720
	EDI	*	2.1	0.470	K0.01	K0.01	K0.05	K0.05	7.57	1,758
MW-11B	DNR	4.0	4.0	0.022	K0.02	K0.02	K0.05	K0.05	6.80	1,680
	EDI	3.5	4.0	0.320	K0.01	K0.01	K0.05	K0.05	7.42	1,676
MW-13A	DNR	K1.0	K2.0	0.125	K0.02	K0.02	K0.05	K0.05	6.60	2,200
	EDI	K1.0	K2.0	0.570	K0.01	K0.01	K0.05	K0.05	7.15	2,161
MW-13B	DNR	K1.0	4.0	0.026	K0.02	K0.02	K0.05	K0.05	6.80	1,645
	EDI	K1.0	5.5	0.260	K0.01	K0.01	K0.05	K0.05	7.25	1,799
MW-14A	DNR	K1.0	6.6	0.118	K0.02	K0.02	K0.05	K0.05	6.60	1,660
	EDI	1.2	6.6	0.260	K0.01	K0.01	K0.05	K0.05	7.28	1,714

K - less than

* - sample vial broken upon log-in

SOURCE: REFERENCE NO. 26

9/15/80

SCAN 1 - PURGEABLE HALOCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Vinyl chloride	5.0
Bromomethane*	5.0
Chloroethane*	5.0
Trichlorofluoromethane*	5.0
1,1-Dichloroethene	1.0
Methylene chloride*	5.0
trans-1,2-Dichloroethene	1.0
1,1-Dichloroethane*	1.0
cis-1,2-Dichloroethene	1.0
Chloroform*	1.0
1,1,1-Trichloroethane*	1.0
Carbon tetrachloride*	1.0
1,2-Dichloroethane*	1.0
Trichloroethene	1.0
1,2-Dichloropropane*	1.0
Bromodichloromethane*	1.0
cis-1,3-Dichloropropene	1.0
trans-1,3-Dichloropropene	1.0
1,1,2-Trichloroethane*	1.0
Tetrachloroethene	1.0
Dibromochloromethane*	1.0
Chlorobenzene	5.0
Bromoform*	1.0
1,1,2,2-Tetrachloromethane*	1.0

* Compound not confirmed by second independent technique.

SCAN 2 - PURGEABLE AROMATIC HYDROCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Benzene	1.0
Toluene	1.0
Ethylbenzene	1.0
Xylene isomers	1.0

Quanex Corp, South Lyons MID 082 767 591

Parameter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic	dissolved	<0.002	0.0034	0.004	<0.002	0.004	0.0066	<0.002
Barium	dissolved	0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium	dissolved	365	374	334	497	391	306	<1
Cadmium	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron	dissolved	3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium	dissolved	7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium	dissolved	32.2	34.2	37.5	78	53	19.7	<1
Manganese	dissolved	0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium	dissolved	84.1	61.3	61.9	61.1	54.6	73	<1
Nickel	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	dissolved	0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Field Conductivity	μmhos/cm	1880	1720	1680	2200	1645	1660	—
Field pH	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	< 2.0
	ug/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT.

HT - The recommended maximum laboratory holding time was exceeded before analysis.

See attached list for organic scan parameters and detection limits.

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY

REPORT Waste Management Division
TO Ottawa Building
Lansing, MI [illegible]

ATTEN [illegible]

LABORATORY WORK ORDER # [illegible]
WORK ID [illegible]
[illegible]
RECEIVED [illegible] CLIENT [illegible]
REPORTED ______ NUMBER OF SAMPLES [illegible]
LAB CONTACT [illegible] MATRIX [illegible]

TEST / UNITS	MW 1	MW 11A	MW 11B	MW 13A
Alkalinity of Water mg CaCO3/l	103	136	120	308
Carbonate Alkalinity mg CaCO3/l	K 5	K 5	K 5	K 5
Bicarbonate Alkalinity mg CaCO3/l	103	136	120	308
Chloride in Water mg/l	47	74	78	44
Arsenic - Dissolved ug/l (Diss)	K 2.0	3.4	4.0	K 2.0
Barium - Dissolved ug/l (Diss)	34.0	72.0	22.0	125
Calcium - Dissolved mg/l (Diss)	365	374	334	497
Cadmium - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Chromium - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Copper - Dissolved ug/l (Diss)	K 20	K 20	K 20	K 20
Iron - Dissolved ug/l (Diss)	3300	5950	3100	3500
Potassium - Dissolved mg/l (Diss)	7.6	10.6	5.14	2.45
Magnesium - Dissolved mg/l (Diss)	32.2	34.2	37.5	78
Manganese - Dissolved ug/l (Diss)	995	885	450	900
Sodium - Dissolved mg/l (Diss)	84.1	61.3	61.9	61.1
Nickel - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Lead - Dissolved ug/l (Diss)	K 50	K 50	K 50	K 50
Zinc - Dissolved ug/l (Diss)	970	K 50	K 50	K 50
FIELD - Conductivity umhos/cm	1980	1720	1680	2200

RECEIVED

APR 15 1988

Waste Management
Division

TEST units	MW 1	MW 11A	MW 11B	MW 12A
FIELD - pH of Water (pH)	5.5	6.8	5.8	5.6
Sulfate in Water (mg/l)	1070	910	818	1120

TEST units	MW 12B	MW 14A	FIELD BLANK
Alkalinity of Water (mg CaCO3/l)	142	350	K 5.0
Carbonate Alkalinity (mg CaCO3/l)	K 5	K 5	K 5
Bicarbonate Alkalinity (mg CaCO3/l)	142	350	K 5
Chloride in Water (mg/l)	50	170	K 1.0
Arsenic - Dissolved (ug/l (Diss))	4.0	6.6	K 2.0
Barium - Dissolved (ug/l (Diss))	26.0	118	K 10.0
Calcium - Dissolved (mg/l (Diss))	391	306	K 1
Cadmium - Dissolved (ug/l (Diss))	K 20	K 20	K 20
Chromium - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Copper - Dissolved (ug/l (Diss))	K 20	K 20	K 20
Iron - Dissolved (ug/l (Diss))	6350	12500	K 100
Potassium - Dissolved (mg/l (Diss))	5.2	3.4	K .1
Magnesium - Dissolved (mg/l (Diss))	53	19.7	K 1
Manganese - Dissolved (ug/l (Diss))	360	170	K 20
Sodium - Dissolved (mg/l (Diss))	54.6	73	K 1
Nickel - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Lead - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Zinc - Dissolved (ug/l (Diss))	K 50	480	K 50
FIELD - Conductivity (umho/cm)	1645	1550	
FIELD - pH of Water (pH)	6.8	6.6	
Sulfate in Water (mg/l)	1050	330	K 2.0

Report approved by: D Harlig 4-14-88

Received: 02/11/89

OVR Laboratory REPORT Work Order # 89-02-041

Results by Sample

SAMPLE ID MW 1 FRACTION 01A TEST CODE 8D 1 NAME Scan 1 Water

Date & Time Collected 02/10/89 11:45:00 Category

ANALYST KAJIYA

ANALYZED 03/01/89

DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

* Compound identity not confirmed by second independent technique.

Received: 02/11/[illegible]

Results by Sample

SAMPLE ID MW 1 PROJECT [illegible] TEST CODE [illegible] NAME [illegible] Water

Date & Time Collected [illegible] Category

ANALYST KAJIYA

DATE [illegible]

DILUTION 1

UNITS ug/L ppb

CAS	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	Benzene	ND		1.0
[illegible]	Toluene	ND		1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene [illegible]	ND		1.0

COMMENTS AT

ND = not detected at the specified detection limit.

Received: 03/11/88

DNR Laboratory REPORT
Results by Sample

Work Order # 88-03-041

SAMPLE ID MW 11A FRACTION 02A TEST CODE 80 1 NAME Grab 1 Water
Date & Time Collected 02/10/88 10:25:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

 DNR Laboratory REPORT Work Order # 88-02-041
Received: 02/11/88 Results by Sample

SAMPLE ID MW 11A FRACTION 02A TEST CODE 8020 NAME Scan 2 Water
Date & Time Collected 02/10/88 13:25:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	Benzene	ND		1.0
[illegible]	Toluene	ND		1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

SAMPLE ID MW 119 PROJECT [illegible] TEST CODE 601 [illegible] Water
Date / Time Collected 02/10/88 13:35:00 Depth

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	4.0		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Page 8 | DNR Laboratory | REPORT | Work Order # 99-02-041

Received: 02/11/99 | Results by Sample

SAMPLE ID MW 11[illegible] | STATION 03A | TEST CODE 8C 2 | NAME Scan 2 Water

Date & Time Collected 02/10/99 13:05:00 | Category

ANALYST KAJIYA
DATED 03/01/99
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	1.1	UC	1.0
100-41-4	Ethylbenzene	ND		1.0
[illegible]	Xylene isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

Received: 02/11/88

DNR Laboratory REPORT Work Order # 88-02-041
Results by Sample

SAMPLE ID MW 12A FRACTION 04A TEST CODE [illegible] [illegible] Scan 1 Water
Date & Time Collected 02/10/88 10:30:00 [illegible]

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit
* Compound identity not confirmed by second independent technique.

SAMPLE ID [illegible] FRACTION 04A TEST CODE [illegible] NAME [illegible] Water
Date & Time Collected 02/10/88 12:30:00 Category ______

TEST [illegible]
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
1330-20-7	Xylene Isomers	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

Received: 02/11/98

DWR Laboratory REPORT Work Order # 98-02-041

Results by Sample

SAMPLE ID MW 13B FRACTION 05A TEST CODE 8C 1 NAME Scan 1 Water

Date & Time Collected: 02/10/98 12:35:00 Category

ANALYST KAJIYA

ANALYZED 03/01/98

DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

* Compound identity not confirmed by second independent technique.

Received: 02/11/88 Results by Sample

[illegible] MW 12B [illegible] 02A [illegible] BG_2 [illegible] Scan 2 Water
Date & Time Collected 02/10/88 12:35:00 Category

[illegible] KASIYA
[illegible] 02/01/88
[illegible] 1

UNITS ug/L ppb

CAS	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	Benzene	ND		1.0
[illegible]	Toluene	ND		1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene Isomers	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

Received: 02/11/88
Results by Sample

SAMPLE ID MW 14A FRACTION 05A TEST CODE SD 1 NAME Scan 1 Water
Date & Time Collected 02/10/88 12:55:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/88 Results by Sample

[illegible] MW 14A [illegible] 06A [illegible] 8D 2 [illegible] Scan 2 Water

Date & Time Collected: [illegible] Category: ____

[illegible] KATIYA

[illegible] 03/01/88

[illegible] 1

[illegible] ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	[illegible]	ND		1.0
[illegible]	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
[illegible]	[illegible]	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

Received: 02/11/89

DWR Laboratory REPORT Work Order # [illegible]

Results by Sample

SAMPLE ID FIELD BLANK

PROJECT 07A TEST CODE [illegible] Scan 1 Water

Date & Time Collected 02/10/89 12:40:00 Category

ANALYST KAJIYA
ANALYZED 03/01/89
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/98 Results by Sample

SAMPLE ID FIELD BLANK STATION 07A TEST CODE 8C_Z NAME Scan C Water
Date / Time Collected 02/10/98 13:40:00 Category

ANALYST KAJIYA
ANALYZED 03/01/98
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
1330-20-7	Xylene Isomers	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected.
SAFETY WARNING
YES / NO - INFO ON BACK

LAB ORDER# 8802-041 PROJ CODE ________ PRIORITY II RECEIVED AT LAB BY JW DATE TIME 2/11/88 9:45 AM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517) - 373 - 2730

LOCATION SAMPLED Quanex, South Lyons COLLECTED BY Browne/Slayton TRANS TO ________

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD - HW Permits S. Ottowa Tower Lansing

SAMPLE REMARKS please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION pH	spec cond
01	MW 1	880210	1145	6.5	1880
02	MW 11A	880210	1325	6.8	1720
03	MW 11B	880210	1335	6.8	1680
04	MW 13A	880210	1230	6.6	2200
05	MW 13B	880210	1235	6.8	1645

GENERAL CHEMISTRY

-J-
DO Diss Oxygen ... 1 2 3 4 5

-K-
GN o-Phos NO2- ... 1 2 3 4 5 GN1
Residue SS 1 2 3 4 5
Residue TDS ... 1 2 3 4 5
.... 1 2 3 4 5
BOD Tot 5 day 1 2 3 4 5
BOD Carb 5 day 1 2 3 4 5
.... 1 2 3 4 5

-L-
GA COD 1 2 3 4 5
TOC 1 2 3 4 5
NO3+NO2, NH3 . 1 2 3 4 5 GA2
KJEL N, Tot P . 1 2 3 4 5
.... 1 2 3 4 5

-M-
GG Phenolics 1.2.3.4.5

-N-
9 Total CN 1.2.3.4.5
Free CN 1.2.3.4.5

-P-
BC Fecal Coli 1.2.3.4.5
Total Coli 1.2.3.4.5

-O-
CA Chlorophyll 1.2.3.4.5

ORGANICS

-R-
PO1 #1 Halocarbons 1 2 3 4 5
PO2 #2 Aromatic HC 1 2 3 4 5
.... 1 2 3 4 5

-S-
ON #3 Chloro HC + Pest & PCB .. 1 2 3 4 5
.... 1 2 3 4 5

-T-
OB GC/MS Base Neut 1 2 3 4 5
.... 1 2 3 4 5

-U-
OA #8 Phenols 1 2 3 4 5
.... 1 2 3 4 5

-V-
OG Oil & Grease .. 1 2 3 4 5

* * * * SPECIAL REQUESTS * * * *

.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5

INORGANIC

-X-
MA Total Metals 1 2 3 4 5
MAD Diss-Field Filtered .. 1 2 3 4 5
MD Diss-Lab Filtered 1 2 3 4 5

Ca Mg Na K 1 2 3 4 5 MA1
Cd Cr Cu Ni Pb Zn..... 1 2 3 4 5 MA2
Fe Co Li Mn.......... 1 2 3 4 5 MA3
Al Ba Be Mo Ti V 1 2 3 4 5 MA4
.... 1 2 3 4 5
Hg - Mercury 1 2 3 4 5
As - Arsenic 1 2 3 4 5
Se - Selenium 1 2 3 4 5
Sb - Antimony 1 2 3 4 5
.... 1 2 3 4 5
LOW LEVEL Ag 1 2 3 4 5
" " Cd 1 2 3 4 5
" " Cr Cu Ni Pb .. 1 2 3 4 5 MF1
.... 1 2 3 4 5

-Y-
MN pH, Conductance 1 2 3 4 5 MN1
Cl, SO4, Total Alk ... 1 2 3 4 5 MN2
HCO3- CO3= 1 2 3 4 5 MN3
CR+6 .... 1 2 3 4 5
Fluoride 1 2 3 4 5
.... 1 2 3 4 5

Page 2 of 2

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected
SAFETY WARNING
YES / NO - INFO ON BACK

ER# 8802-041 PROJ CODE ________ PRIORITY II RECEIVED AT LAB BY JL DATE TIME 2/11/88 9:45 AM PM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517) - 373-2730

LOCATION SAMPLED Quanex South Lyons COLLECTED BY Browne/Slayton TRANS TO ________

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD- HW Permits S. Ottowa Tower Lansing

SAMPLE REMARKS Please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION pH	spec cond.
06	MW 14A	880210	1255	6.6	1660
07	FB Field Blank	880210	1340	—	—
03					
04					
05					

GENERAL CHEMISTRY

DO	Diss Oxygen ... 1 2 3 4 5		J
GN	o-Phos NO2- ... 1 2 3 4 5	GN1	K
	Residue SS 1 2 3 4 5		
	Residue TDS ... 1 2 3 4 5		
	.... 1 2 3 4 5		
	BOD Tot 5 day 1 2 3 4 5		
	BOD Carb 5 day 1 2 3 4 5		
	.... 1 2 3 4 5		
GA	COD 1 2 3 4 5		L
	TOC 1 2 3 4 5		
	NO3+NO2, NH3 .. 1 2 3 4 5	GA2	
	KJEL N, Tot P . 1 2 3 4 5		
	.... 1 2 3 4 5		
GG	Phenolics 1.2.3.4.5		M
GB	Total CN 1.2.3.4.5		N
	Free CN 1.2.3.4.5		
	Fecal Coli 1.2.3.4.5		P
	Total Coli 1.2.3.4.5		
CA	Chlorophyll 1.2.3.4.5		Q

ORGANICS

PO1	#1 Halocarbons 1 2 3 4 5	R
PO2	#2 Aromatic HC 1 2 3 4 5	
	.... 1 2 3 4 5	
ON	#3 Chloro HC + Pest & PCB . 1 2 3 4 5	S
	.... 1 2 3 4 5	
OB	GC/MS Base Neut 1 2 3 4 5	T
	.... 1 2 3 4 5	
OA	#8 Phenols 1 2 3 4 5	U
	.... 1 2 3 4 5	
OG	Oil & Grease .. 1 2 3 4 5	V

**** SPECIAL REQUESTS ****

.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5

INORGANIC

MA	Total Metals 1 2 3 4 5		X
MAD	Diss-Field Filtered ... 1 2 3 4 5		
MD	Diss-Lab Filtered 1 2 3 4 5		
	Ca Mg Na K 1 2 3 4 5	MA1	
	Cd Cr Cu Ni Pb Zn 1 2 3 4 5	MA2	
	Fe Co Li Mn 1 2 3 4 5	MA3	
	Al Ba Be Mo Ti V 1 2 3 4 5	MA4	
	.... 1 2 3 4 5		
	Hg - Mercury 1 2 3 4 5		
	As - Arsenic 1 2 3 4 5		
	Se - Selenium 1 2 3 4 5		
	Sb - Antimony 1 2 3 4 5		
	.... 1 2 3 4 5		
	LOW LEVEL Ag 1 2 3 4 5		
	" " Cd 1 2 3 4 5		
	" " Cr Cu Ni Pb .. 1 2 3 4 5	MF1	
	.... 1 2 3 4 5		
MN	pH, Conductance 1 2 3 4 5	MN1	Y
	Cl, SO4, Total Alk 1 2 3 4 5	MN2	
	HCO3- CO3= 1 2 3 4 5	MN3	
	CR+6 .... 1 2 3 4 5		
	Fluoride 1 2 3 4 5		
	.... 1 2 3 4 5		

SOURCE: REFERENCE NO. 27

upgradient well 1 are summarized in Attachment C.

A list of constituents which were measured above the mean background level and above their detection limit for the first quarter of 1988 are listed below by well. Due to the low calculated mean background values, most of the constituents measured above their detection limits are automatically above their mean background value.

WELL NUMBER	*CONSTITUENT*	*MEASURED CONCENTRATION*
11A	*1,1-dichloroethane	1.8 **
11A	arsenic	2.1 ppb
11A	barium	470 ppb
11B	1,1-dichloroethane	3.5 ppb
11B	arsenic	4.0 pbb
11D	arsenic	6.0 ppb
12A	*selenium	10 ppb
12B	arsenic	8.0 ppb
13A	barium	570 ppb
13B	arsenic	5.5 ppb
14A	1,1-dichloroethane	1.2 ppb
14A	arsenic	6.6 ppb

** *Duplicate sample recorded. Original sample vial broken upon log-in.*

Constituents with an asterisk (*) in front of them were also above the detection limits during the fourth quarter 1987 sampling. Analyses of these constituents are statistically compared to background in Attachment F, and will be discussed later. The other ten constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the second quarter sampling, 1988. Data from these samples will be combined with the data from this first quarter, 1988, to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the fourth quarter of 1987 was above the mean background concentration, and above the detection limit, then that well was

SOURCE: REFERENCE NO. 32

WELL NUMBER	*CONSTITUENT*	*MEASURED CONCENTRATION*
11A	1,1-dichloroethane	4.1 ppb
11B	*1,1-dichloroethane	5.3 ppb
	*arsenic	3.7 ppb
11D	*arsenic	4.6 ppb
12A	copper	10.0 ppb
	selenium	2.9 ppb
12B	*arsenic	9.2 ppb
13B	*arsenic	5.6 ppb
14A	*1,1-dichloroethane	1.2 ppb
	*arsenic	8.4 ppb
16A	copper	30.0 ppb

Constituents with an asterisk (*) in front of them were also above the detection limits during the third quarterly sampling. Analyses of these constituents are statistically compared to background in Attachment E, and will be discussed later. The other four constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the first quarter sampling, 1988. Data from these samples will be combined with the data from the fourth quarter, 1987, to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the third quarter of 1987 was above the mean background concentration, and above the detection limit, then that well was purged and sampled three times during this quarterly sampling. The three resulting samples were each analyzed for the specific detected constituent. The results of these analyses along with the data from the third quarter are presented in Attachment D. Only the first of the three new samples is reported in the overall analytical results in Attachment B.

Attachment E statistically compares these seven downgradient samples to the background data from well 1. The statistical test which was used tests the null hypothesis:

> H_O: The concentration of the constituent in the downgradient well is not greater than the concentration in the background, upgradient well.

versus the alternate hypothesis:

> H_1: The concentration of the constituent in the downgradient well is greater than the concentration in the background, upgradient well.

When the statistical test indicates that we can reject H_O with a confidence level of 99%, then we accept H_1. (NOTE: This test assumes a normally distributed population.) The decision to accept or reject H_O is documented in Attachment E and is summarized below.

SOURCE: REFERENCE NO. 35

Quanex Corporation
100 McMunn
South Lyon, Michigan 48178
(313) 437-1715

Quanex

January 4, 1988

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Groundwater Quality Division
15500 Sheldon Road
Northville, Michigan 48167

Attn: Mr. Harim Shakir

Dear Sir,

This letter will confirm the action taken for the months of July, 1987 through December, 1987, in compliance with the bi-yearly report of the Continuing Recovery of Oil from the ground.

SUMMARY OF JULY THRU DECEMBER INCIDENT TO DATE DATA

Total Gallons of Fuel Oil Recovered	Total Gallons of Fuel Oil Recovered to December 30, 1987
10	289,638

The well monitoring observation is still being conducted on a bi-monthly schedule.

Sincerely,
QUANEX CORPORATION
Michigan Seamless Tube Division

C. D. Simpson
Chief Engineer

CDS:st
cc: J.J. Yetso
W.V. Merchant
D.F. Comfort

SOURCE: REFERENCE NO. 36

SITE DESCRIPTION/EXECUTIVE SUMMARY

Site Name and Location

Quanex Corporation
400 McMunn
South Lyon, MI 48178

County: Oakland
Michigan Code Number: 63-01N-07E-30AC
DNR District: Detroit
EPA ID Number: MID082767591

SAS Score/Screen No.: 06

The Quanex Corporation site experienced a loss of 420,000 gallons of fuel oil in 1974. A field investigation from the Michigan Water Resources Commission noted an accumulation of oil in the Yerkes Drain and in wetlands at the southwest corner of the site on March 9, 1974. A remedial action plan was implemented involving the use of recovery pits, an interceptor drain, and recovery booms in the Yerkes Drain. As of May 31, 1985, 289,513 gallons of fuel were recovered. The MDNR District Office in Northville has records of test results from monitor well sampling. City of South Lyon municipal wells are approximately ¼ mile from the spill site, but no contamination has been detected. MDNR groundwater information indicates that groundwater flow is to the south-southwest, directly into the Yerkes Drain. At present, only trace levels of fuel are reclaimed in the recovery system.

Recommendations for EPA

This site receives a low priority for inspection as petroleum products are not CERCLA regulated hazardous substances.

Pre-HRS Score: N/A
Projected HRS Score: N/A
SI Priority: Low
Hours Spent: 6 hrs + 1.0 + ___ + ___ + ___ = ___
Initial & Date: PL 11/10/87 SC 11-10-87

Date of Previous Summary: 12/2/85
Previous Author: N. Rottschafer

Current Date: 11/10/87
Author: D. Courtney

Site Assessment Unit
Environmental Response Division
Michigan Dept. of Natural Resources

SOURCE: REFERENCE NO. 38

A list of constituents which were measured above the mean background level and above their detection limit for the third quarter are listed below by well. Due to the low calculated mean background values, any constituent measured above its detection limit is automatically above the mean background value.

WELL NUMBER	*CONSTITUENT*	*DETECTION LIMIT*
11A	1,1-dichloroethane	9.9 ppb
11B	1,1-dichloroethane	6.1 ppb
	arsenic	4.9 ppb
11D	arsenic	5.9 ppb
12B	arsenic	9.4 ppb
13B	arsenic	5.9 ppb
14A	1,1-dichloroethane	1.1 ppb
	arsenic	8.6 ppb

With the exception of well 11A, which is statistically analyzed in this letter, all of the above constituents will be resampled three times with purging in between. The resampling for the above-mentioned constituents will occur concurrently with the fourth quarter sampling for this project which is scheduled for mid-November. Data from these samples will be combined with the data from this third quarter to statistically compare the concentrations to background data using the t-Test with the continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program.

The four constituent well pairs that were sampled three times in the third quarter are presented in Attachment D. Attachment E statistically compares these four downgradient samples to the background data from well 1. The statistical test which was used tests the null hypothesis:

H_O: The concentration of the constituent in the downgradient well is less than or equal to the concentration in the background, upgradient well.

versus the alternate hypothesis:

H_1: The concentration of the constituent in the downgradient well is greater than the concentration in the background, upgradient well.

When the statistical test indicates that we can reject H_O with a confidence level of 99%, then we accept H_1. (NOTE: This test assumes a normally distributed population.) The decision to accept or reject H_O is documented in Attachment E and is summarized below.

WELL NUMBER	*PARAMETER*	*DECISION*
11A	1,1-dichloroethane	do not reject H_O
11A	barium	do not reject H_O
11D	barium	do not reject H_O
12A	barium	do not reject H_O

SOURCE: REFERENCE NO. 46

quarter are presented in Attachment D. It should be noted that the first of the three new samples is the same sample that is presented for the second quarter sampling in Attachment B.

During the first 1987 quarterly sampling, the distilled water used for decontamination was carried to the site in a steel drum. This resulted in the contamination of the distilled water with small amounts of cadmium and copper, and may have contaminated the first quarter sample from well 11D with cadmium. During the second 1987 quarterly sampling, all distilled water was transported to the site in plastic containers. None of the measured constituents were detected in the field blank collected during this sampling. During the remaining sampling periods, distilled water will always be carried to the field in plastic containers.

A list of constituents which were measured above the mean background level and above their detection limit are listed below by well. Due to the low calculated mean background values, any constituent measured above its detection limit is automatically above the mean background value.

WELL NUMBER	*CONSTITUENT*	*DETECTION LIMIT*
11A	1,1-dichloroethane	3.0 ppb
	barium	0.20 ppm
11B	*1,1-dichloroethane	2.1 ppb
	*arsenic	2.4 ppb
11D	*arsenic	5.3 ppb
	barium	0.13 ppm
12A	barium	0.18 ppm
12B	*arsenic	9.3 ppm
13B	*arsenic	7.6 ppb
14A	*arsenic	8.7 ppb

Constituents with an asterisk (*) in front of them were also above the detection limits during the first quarterly sampling. Analyses of these constituents are statistically compared to background in Attachment E, and will be discussed later. The other four constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the third quarterly sampling for this project which is scheduled for mid-August. Data from these samples will be combined with the data from this quarter to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program.

The concentrations of detected constituents (listed above) are very low. 1,1-Dichloroethane was not detected above 3 ppb, and the concentrations of arsenic and barium are all five times lower than the maximum concentration of constituents for groundwater protection given in 40 CFR 264.94, Table 1.

SOURCE: REFERENCE NO. 47

611 Cascade West Parkway, SE • Grand Rapids, Michigan 49506-2179 • (616) 942-9600

HAZARDOUS WASTE

RECEIVED

MAY 22 1987

NOV 09 1987

RECEIVED

WASTE MANAGEMENT DIV.

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

ORIG - C+E
xc - District Det. WMD
xc - Geotech Unit

A copy for your files if you don't have one.
Dave Slayton

May 21, 1987

Mr. Dave Slayton
Michigan Department of Natural Resources
Waste Management Division
P O Box 30028
Lansing, MI 48909

Groundwater Files

RE: QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISION
EPA NO. MID082-767-591
1986 ANNUAL REPORT

Dear Dave:

Due to the extended period of time required to gain approval of the current Groundwater Quality Assessment Plan, only the extensive "initial sampling" was performed during 1986. This letter summarizes the development of this document and summarizes the information gathered during 1986. To place the events of 1986 in context, the following discussion begins in the end of 1985.

At the end of 1985, the facility referenced above was operating under a revised Groundwater Quality Assessment Plan (GQAP) developed by Keck Consulting Services which was submitted to the EPA on October 25, 1985. In Step 1 of this plan, monitoring wells 1 through 4 were sampled and analyzed for metals and volatile organics. The results of these analyses were submitted to EPA in a letter from Don Comfort, Quanex Corporation, dated December 18, 1985. Methylene chloride was detected in all four samples, so the four wells were resampled on December 23, 1985 (Step 2), and the results from these analyses were sent to the EPA in a letter from Mr. Comfort dated January 22, 1986.

Step 3 of the October, 1985 GQAP consisted of the installation and testing of additional monitoring wells for the parameters detected in Steps 1 and 2. This step was designed to help identify the source and extent of any groundwater contamination and to further define the hydrogeology beneath the site. Since additional monitoring wells had already been installed and a more detailed hydrogeologic report had been written for the Part B permit application, it was determined that the October, 1985 GQAP would be revised to reflect the present situation. In a phone call on January 20, 1986 between Jim Tolbert, EDI and Margo Dilday, EPA, Ms. Dilday agreed that the EPA would review the Quanex hydrogeologic report and would then discuss the revisions to the GQAP. On January 22, 1986 a copy of the hydrogeologic report on the facility was sent to Ms. Dilday by Mr. Tolbert.

On February 13, 1986 Joe Baker, EPA, called Mr. Tolbert with the EPA's concerns on the revisions to the GQAP. In this phone call, Mr. Tolbert indicated that the revised GQAP would be in the mail the week of February 24, and on Friday, February 28 the February, 1986 revision of the GQAP was sent to Ms. Dilday.

On March 5, 1986 Mr. Tolbert called Ms. Dilday to confirm the arrival of the revised GQAP. On March 28, Mr. Baker called Mr. Tolbert with additional changes to be made to the February, 1986 revision of the GQAP. These changes were made and the April, 1986 revision of the GQAP was sent to Mr. Baker on April 14.

At the end of May, 1986, Mr. Baker called Mr. Tolbert with additional changes which were required, and these revisions were mailed to the EPA on July 31. This package contained only the pages affected by the July, 1986 revisions which were to be inserted into the April revision of the GQAP.

This GQAP was approved contingent upon one additional change by William Muno, EPA, in a letter to Mr. Comfort, dated September 4, 1986. This change was submitted in a letter to Mr. Baker from Mr. Tolbert dated October 10, 1986, as a single page to be replaced in the revised April, 1986 GQAP. Then, the initial sampling under this program was performed on October 15 through 17.

The results from this sampling event were reported in a letter to Mr. Baker dated December 4, 1986. These analyses did not detect methylene chloride in any of the 20 wells sampled, or in the trip blank. Since methylene chloride was not detected in any of these wells, and since methylene chloride is a common laboratory contaminant due to its use as a common solvent in cleaning procedures, its previous results are not attributed to groundwater contamination. Arsenic and/or 1,1-dichloroethane were detected slightly above background levels in wells 11A, 11B, 11D, 12B, 13B, and 14A. To perform the required statistical analyses, these wells were resampled in triplicate on December 22 and 23, 1986. The chemical and statistical analyses from these wells were reported in a letter to Dave Slayton, MDNR from Mr. Tolbert dated February 11, 1987. These results from 1986 are summarized in attachments to this letter.

The annual report for a facility where ". . . the groundwater is monitored to satisfy the requirements of [40 CFR] 265.93(d)(4) [a Groundwater Quality Assessment Plan], the owner or operator must . . . annually . . . submit to the Regional Administrator a report containing the results of his or her Groundwater Quality Assessment Program, which includes, but is not limited to, the calculated (or measured) rate of migration of hazardous waste constituents in the groundwater during the reporting period." [40 CFR 265.94(b)]. The results included in the attachments to this letter contain all of the results of the GQAP collected during 1986. This consists of: 1) initial sampling results; 2) resampling analytical results; 3) statistical evaluation; and 4) evaluation of rate and extent of migration.

If you have any questions with the information in this letter, do not hesitate to call me.

Sincerely,

EDI ENGINEERING & SCIENCE

James Tolbert

James N. Tolbert
Hydrogeologist

JNT/mck

Enclosure

cc: D. Comfort, Quanex Corp.

4

EVALUATION OF RATE AND EXTENT OF MIGRATION

EXTENT OF MIGRATION

During the initial sampling on October 17, 1987, it was found that 1,1-DCA was present at concentrations slightly above background in wells 11A and 11B. The volatile organic scans done on these initial samples measured 6 ug/L in both of these wells. On December 22, 1986 these two wells were each sampled three times, and each of these samples also contained low levels of 1,1-DCA (all below 6 ug/L). On March 11 and 12, these wells, along with surrounding wells, were sampled again as part of the quarterly monitoring program. Wells 1, 9, 11A, 11B, 11D, 12A, 12B, 13A, 13B, 14A, and 16A were sampled. All wells, except 11B, were below the detection limit (1 ug/L) for 1,1-DCA. Well 11B was found to contain 4 ug/L 1,1-DCA.

It should be emphasized that wells 11D and 16A were both below the detection limit. Well 16A is directly down gradient from the impoundments (see Figure 1 and rate of migration section) and nearly directly downgradient from well cluster 11. This shows that 1,1-DCA has not migrated from the impoundments to this extent. Likewise, the absence of detectable 1,1-DCA in 11D shows that the plume has not migrated downward to that depth.

In addition, the low concentrations (3 to 6 ug/L) suggest a possible source from contamination during well construction. These monitoring wells were installed to monitor for trace metals, and, therefore, were not installed using the same cleaning procedures required for low level (single digit parts per billion) organics monitoring.

IN-SITU PERMEABILITIES

In-situ permeability calculations were done on several wells to determine the hydraulic conductivity of the aquifer. The Bouwer and Rice (1976) method was used to evaluate the data, and input parameters are shown on Table 2 along with the permeability values.

Values of permeability ranged from 0.03 ft/day (1.1×10^{-5} cm/sec) to 26.6 ft/day (9.4×10^{-3} cm/sec). These data are typical of glacial outwash deposits which range from clayey and silty sand to gravels. It is possible that higher permeability zones do exist in this aquifer. However, these zones, given the nature of this deposit, would not likely continue for great distances.

RATE OF MIGRATION OF 1,1-DCA

Water level measurements for several wells near the surface impoundments were measured on October 15, 1986 just prior to the initial sampling period (see Table 1). These data show that the disturbance in the groundwater flow pattern due to mounding around the impoundments occurs only locally. Within approximately 50 feet horizontally and 30 feet vertically the groundwater flow has nearly returned to its regional pattern.

The wells screened between 865 and 885 feet a.s.l. (indicated by the suffix "B" after the well number), provide a good indication of horizontal flow away from the impoundments. Figure 1 shows the head elevation contours and a general flow line passing through well cluster 11 for these wells. These data were chosen because there is good control on the horizontal gradient and they provide a maximum estimate in that the observed gradient at this level is larger than that above this level.

Groundwater flow down gradient of the impoundments below this level is unobtainable with the present well configuration. However, the trends established by head elevations in deeper wells near the impoundments (e.g., 11C, 11D, 12C, and 13C) suggest there is a regional upward movement of groundwater from the deeper zones of the aquifer, and that the downward flow of groundwater from the shallow wells (suffix "A") to the intermediate depth wells (suffix "B") is caused by the surface impoundments. This is substantiated by the fact that this downward gradient is lower in well clusters 14 and 15 than in well clusters 11 and 16 which are near surface waters and more directly downgradient from the impoundments.

Therefore, these data suggest that any potential downward migration of contaminants will be limited by a groundwater flow direction reversal, and that contaminant migration downward will decrease moving away from the impoundments. These data also support the selection of the intermediate depth wells (suffix "B") as good indicators of a maximum horizontal migration.

From Figure 1, the flow from the impoundments is generally to the west. South of the impoundments the direction shifts to the northwest. The gradient along the indicated flow line is 1.67×10^{-3}.

In-situ permeability tests were performed on several wells to determine the horizontal hydraulic conductivity of the aquifer (see above section on in-situ tests). These include wells 1, 5, 11B, 11C, 12A, 12B, 13A, 13B, 13C, 14A, 15A, 15B, 16A, and 16B. Well 12B recorded the highest hydraulic conductivity at 26.6 ft/day (9.4 X 10^{-3} cm/sec). This value is nearly an order of magnitude higher than any measured permeability downgradient from the impoundments. It should be noted that well 11A was untestable due to the oscillation of water level in the well during the test. At this time the relationship between these oscillations and formation permeability is unknown. It is possible that the oscillations are caused by high permeabilities.

If we accept the hydraulic conductivity measured at 11B (0.09 ft/day or 3.2 X 10^{-5} cm/sec) as representative of formation permeability away from the impoundments, we can calculate the groundwater velocity.

Using the relationship that:

$$v = \frac{ki}{n}$$

where:

v = average linear velocity of the groundwater

k = hydraulic conductivity

n = formation porosity

i = gradient

we can, by assuming a porosity of 35% (n = 0.35), calculate the groundwater velocity. In this case, the expected flow away from the impoundments is 4.3 X 10^{-4} ft/day (1.56 X 10^{-7} cm/sec).

However, this aquifer is typical of outwash deposits and is subject to changes in lithologies over short distances. Areas of both high and low hydraulic conductivities are observed. Well 11B is likely screened in an unusually low permeability zone. Flow within such an aquifer will concentrate in the high permeability zones. Therefore, in order to produce a conservative estimate of groundwater velocity (i.e., maximum likely velocity) away from the impoundments it is logical to pick the maximum measured permeability or one slightly higher. Consequently, in order to estimate the horizontal flow, a hydraulic conductivity of 2.83 ft/day (1 X 10^{-2} cm/sec) is assumed. Using the relationship outlined above, we find a maximum expected groundwater velocity of 0.14 ft/day (4.8 X 10^{-5} cm/sec). This estimate is also conservative in that it does not take into account natural attenuation by the soils or dispersion.

If we assume a vertical hydraulic conductivity at one-tenth the maximum horizontal (i.e., 2.83 ft/day or 1 X 10^{-3} cm/sec), we can also estimate the downward velocity. At well cluster 11 we observed a vertical gradient of 5.09 X 10^{-2} between wells 11A and 11C. This suggests an average flow velocity between them of 0.412 ft/day (1.45 X 10^{-4} cm/sec). However, the flow between 11C and 11D is upward with a relatively large gradient (8.72 X 10^{-2}) suggesting a direction reveral between wells 11B and 11C (i.e., between 859 and 885 feet a.s.l.). This would limit any potential downward migration of groundwater and contaminants.

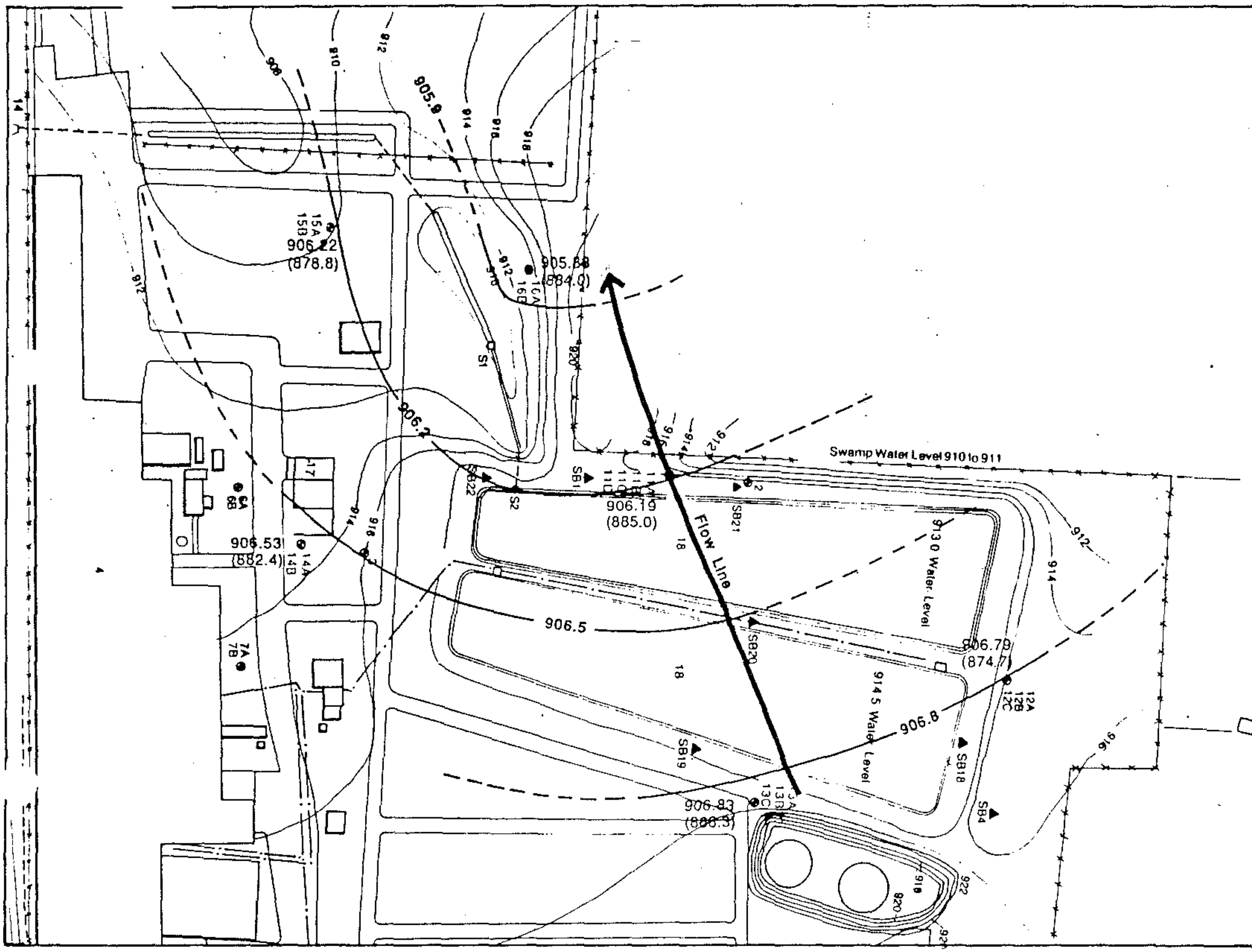


Figure 1

Flow Within Aquifer for Screened Interval Between 865 and 885

Quanex

May, 1987

20515

SOURCE: REFERENCE NO. 54

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
SURFACE WATER QUALITY DIVISION
SEPTEMBER 25, 1986

STAFF REPORT

AQUATIC TOXICITY ASSESSMENT OF EFFLUENT FROM QUANEX CORPORATION; MICHIGAN SEAMLESS TUBE DIVISION SOUTH LYON, MICHIGAN FEBRUARY 26-28, 1986 MI 0001902

As part of a routine compliance inspection survey, the Michigan Department of Natural Resources, Great Lakes and Environmental Assessment Section conducted an in-lab, *Daphnia magna* acute toxicity test on a 24 hour composite sample of Quanex Corporation, Michigan Seamless Tube Division effluent (outfall 001). The acute toxicity test was conducted during the period of February 26-28, 1986. The primary objectives of the study were to assess the acute toxicity of the effluent to *D. magna*; and to evaluate whether additional acute toxicity tests should be performed at the site in the immediate future.

SUMMARY AND RECOMMENDATIONS

1. Effluent from outfall 630062 (001) was not acutely toxic to the invertebrate *D. magna*.

2. Effluent from outfall 001 is not considered a priority candidate for additional acute toxicity testing in FY 1986.

FACILITY DESCRIPTION

The Michigan Seamless Tube Company manufactures seamless steel tubing. Steel rods are used to make the seamless tubes by heating, displacing, cooling, pickling, cold drawing, annealing, and cleaning in alkali baths. The company's water usage is for boiler feed water, pickle house operations, noncontact cooling water make up (recycled in cooling towers), and contact cooling waters. All wastewater streams are combined and treated by a central station utilizing the slack quick lime process, the lime is used as a flocculent and a neutralization agent. The waste is then aerated and pumped to two series stabilization lagoons, where solids are allowed to settle before final discharge from outfall 001, via Yerkes drain to Lime Kiln Lake.

METHODS

On February 24-25, 1986, MDNR-Compliance Section #2 personnel conducted a routine compliance inspection survey at the Quanex Corporation, Michigan

Seamless Tube Division located in South Lyon, Michigan. A 24-hour composite sample of final effluent was collected from outfall 630062 (outfall 001). The sample was cooled to 4°C and transported to Lansing for aquatic toxicity testing and analytical chemical characterization. Sample preservation techniques and organic scan parameter listing for the analytical samples are given in Appendices A and B.

During the period of February 26-28, 1986, a 48-hour D. magna static toxicity test was conducted on the 24-hour composite sample of Michigan Seamless Tube Division's outfall 001 effluent in the MDNR-Toxicity Evaluation Laboratory. Testing was performed according to the procedures described in ASTM D 4229; Standard Practice for Conducting Static Acute Toxicity Tests on Wastewater with Daphnia. The effluent sample and aerated, activated carbon filtered Lansing city water (diluent) were used to prepare nominal test concentrations of 100, 60, 36, 22, 13, and 0 (control) percent effluent. Four replicate 250 ml glass beakers, each containing 150 ml of test solution were prepared for each concentration and control. Beakers containing various test solutions, but without daphnids, were analyzed for selected physical and chemical parameters (dissolved oxygen, conductivity, pH, temperature, alkalinity, hardness) at the beginning and end of the exposure period.

D. magna neonates, 12+12 hours old, were used as test organisms. These daphnids were obtained from MDNR cultures and were fed algae prior to testing. Five daphnids were randomly selected and placed in each test chamber. The daphnids were observed after 24 and 48 hours of exposure to determine the number immobilized in each beaker. Immobilization, defined as the inability to swim for 5 seconds when stimulated, was used as the test end point.

RESULTS AND DISCUSSION

Acute toxicity data generated during the period of February 26-28, 1986, indicate that the Michigan Seamless Tube Division's effluent from outfall 001 appeared to exhibit a low level of acute toxicity to the invertebrate D. magna (Table 1). Immobilization of 10% of the daphnids in 100% effluent concentration constituted the only evidence of acute toxicity observed. This level of acute toxicity is well within the requirements of Rule 82 of the Michigan Water Quality Standards.

Test chamber water chemistry and physical data generated during the acute toxicity test are shown in Table 2. Water quality parameters in the test solutions did not change substantially during the exposure period and remained within their respective acceptable ranges for toxicity testing.

Wastewater characterization data generated for the composite sample of Michigan Seamless Tube Division's effluent (outfall 001) are presented in Table 3. The D. magna acute toxicity test results are consistent with the effluent sample's predicted acute toxicity based on a chemical specific analysis of the wastewater characterization data available.

Acute toxicity data generated in this study with D. magna suggest that Michigan Seamless Tube Division's outfall 001 effluent is satisfying the aquatic toxicity-related requirements of Rule 82 of the Michigan Water Quality Standards. Consequently, additional acute toxicity assessment studies are not recommended for this discharge during FY 1986 or 1987.

Report by: Scott Cornelius, Aquatic Biologist
Great Lakes and Environmental Assessment Section

Sample collection by: John Ecklund, Water Quality Technician

Aquatic toxicity testing by: Scott Cornelius, Aquatic Biologist

Table 1. Percent immobilization of *Daphnia magna* exposed to select concentrations of Michigan Seamless Tube Division's outfall 001 effluent during the period of February 26-28, 1986.

	Percent Immobilization/Exposed Period	
Percent Effluent	24 Hours	48 Hours
Control*	0	0
13	0	0
22	0	0
36	0	0
60	0	0
100	0	10

*Control was carbon-filtered Lansing city water.

Table 2. Chemical and physical analyses of control and selected effluent concentrations during the static, acute *Daphnia magna* toxicity test conducted on Michigan Seamless Tube Division's outfall 001 effluent during the period of February 26-28, 1986.

	BEGIN 02/26/86			END: 02/28/86		
Parameter	Control	36%	100%	Control	36%	100%
Dissolved oxygen (mg/l)	8.7	8.6	9.9	8.8	8.9	8.8
pH (S.U.)	7.6	7.8	7.7	7.6	8.0	8.2
Temperature (°C)	20.0	20.0	20.5	21.0	20.5	20.5
Conductivity (umhos)	362.8	691.8	118.9	378.8	765.3	130.5
Alkalinity (mg/l)	40	92	196	48	74	216
Hardness (mg/l)	100	270	580	116	316	640

Table 3. Chemical analyses of composite and grab samples of Quanex Corporation - Michigan Seamless Tube Division -- Outfall 001 effluent during the period of May 19-20, 1986

Parameter	Composite	Grab	Grab	Grab
Date:	02/24/86-02/25-86	02/24/86	02/24/86	02/25/86
Time:	1020-1010	1040	1450	1020
Total organic carbon	3.08	2.98	3.33	2.75
BOD 5 - total	--	4.0	3.8	3.8
BOD 5 - carbonaceous	4.1	--	--	3.0
Suspended solids	15	7.0	<4	<4
Nitrate/nitrite nitrogen	3.8	4.2	4.0	4.2
Ammonia nitrogen	0.01	0.01	0.01	<0.01
Kjeldahl nitrogen	0.86	0.69	0.79	0.59
T. phosphorus	0.148	0.119	0.120	0.155
Oil and grease	--	<2.0	<2.0	--
Cadmium (ug/l)	0.2	<0.2	<0.2	<0.2
Chromium (ug/l)	<50	<50	<50	<50
Copper (ug/l)	<20	<20	<20	<20
Iron (mg/l)	1430	490	470	845
Mercury (ug/l)	<0.5	<0.5	<0.5	<0.5
Sulfate	402	--	--	--
Nickel (ug/l)	<50	<50	<50	<50
Lead (ug/l)	<50	<50	<50	<50
Zinc (ug/l)	340	380	370	410
Chloride	40.6	--	--	--

All values are mg/l unless otherwise indicated.

SOURCE: REFERENCE NO. 57

Quanex Corporation
Michigan Seamless Tube Division
00 McMunn
South Lyon, Michigan 48178
313) 17

Quanex Michigan Seamless Tube Division

July 25, 1986

Mr. Joe Baker
USEPA Region 5
Mail Code 5HE-12
230 South Dearborn St.
Chicago, Illinois 60604

Re: Quanex - 1974 Oil Spill
EPA ID: MID-082-767-591

Dear Mr. Baker:

Enclosed please find the following information which you requested from Jim Tolbert of E.D.I. Engineering and Science pertaining to the 1974 oil spill at Quanex which we discussed briefly this morning.

1. Location and Extent of Oil Spill

   Quanex Drawing FP-000-A-012 - dated 3/27/74

   This drawing was made the week following the detection of the oil spill. The X's on the lower right hand section indicate where oil was found in excavations at the site. Oil was found on the south side of our plant from column line 10 through 31, or for a length of 420 feet.

   Ground water monitor well #8 was installed in 1985 in line with column 43 and is shown as a red dot on this drawing.

2. Volume of Oil Spill and Date Discovered

   Letter from U.W. Stoll and Associates - dated 6/10/74 - 3 pages

   This letter summarized discussions of the then proposed oil interceptor system and the results of soil borings. It mentions the discovery date of March 21, 1974 and estimates the volume of oil spilled at 200,000 to 300,000 gallons.

3. Approximate Composition of Oil Spilled

   Memo from D.A. Nebrig - dated 8/28/74 - 2 pages
   Letter for MDNR - dated 8/27/74 - 1 page

   Testing by the MDNR confirmed a match between oil discovered in the surface water west of our plant and oil sampled from under our plant. The oil was a high distillate grade of fuel oil equivalent to commercial grade #1, #2, or #3.

4. Detailed Soil Investigation

Report from Halpaert, Neyer, & Associates - dated 10/23/74
6 pages, 5 plates, 13 figures

Details soil and groundwater investigation undertaken in conjunction with the oil interceptor installation.

5. Current Status

Letter to H. Shakir of the MDNR - dated 6/25/86

We are presently collecting 5 to 6 gallons of oil per month from the interceptor and reporting semi-annually to the Michigan Department of Natural Resources. Total oil recovered to date is 289,593 gallons.

6. Ground Water Monitoring Data

MW-8 VOS lab report - dated 11/11/85 - 1 page
MW-8 VOS lab report - dated 3/02/86 - 1 page
MW-8 VOS lab report - dated 6/27/86 - 1 page

Volatile organic scans of groundwater samples down gradient of the oil spill area show low levels of 1,1 - Dichloroethane and trans -1,2 - Dichloroethene. Methylene chloride was not detected in any samples.

I Believe the information enclosed should be sufficient for your evaluation of the oil spill area. However, should you have any questions, please call me at 313-437-8117.

Sincerely,

Quanex Corporation
Michigan Seamless Tube Division

Donald F. Comfort

Donald F. Comfort, P.E.
Engineering Manager

cc: C. D. Simpson
D. L. Slayton - Michigan DNR
J. Tolbert - EDI Engineering and Science

SOURCE: REFERENCE NO. 60

TABLE 1

PARAMETERS CHARACTERIZING
THE SUITABILITY OF THE GROUNDWATER AS A DRINKING WATER SUPPLY

	Units	12-23-83	3-14-84	6-20-84	9-27-84
Monitoring Well 1					
Arsenic	(mg/l)	<0.001	<0.01	0.001	ND(0.001)
Barium	(mg/l)	0.19	<0.2	ND(2)	0.27
Cadmium	(mg/l)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)
Chromium	(mg/l)	ND(0.005)	0.005	ND(0.01)	ND(0.003)
Fluoride	(mg/l)	0.1	0.1	0.2	0.1
Lead	(mg/l)	<0.01	0.01	0.02	<0.01
Mercury	(mg/l)	ND(0.0002)	ND(0.0002)	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	<0.01
Silver	(mg/l)	ND(0.003)	0.006	0.004	0.008
Endrin	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.50)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.50)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.10)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	<3	<3	<3
Gross Alpha	(pCi/l)	9	<5	<5	5
Gross Beta	(pCi/l)	ND(8)	<8	<8	18
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)
Monitoring Well 2					
Arsenic	(mg/l)	0.014	<0.01	0.021	0.016
Barium	(mg/l)	0.11	<0.2	ND(2)	0.14
Cadmium	(mg/l)	ND(0.003)	0.003	<0.003	<0.003
Chromium	(mg/l)	0.005	0.013	ND(0.01)	<0.001
Fluoride	(mg/l)	0.2	0.2	0.1	0.20
Lead	(mg/l)	0.05	0.05	0.04	0.06
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	0.03	ND(0.01)	0.37
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	0.017
Silver	(mg/l)	ND(0.003)	0.005	ND(0.003)	<0.003
Endrin	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.50)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.50)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.10)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	4	<3	<3
Gross Alpha	(pCi/l)	ND(5)	8	<5	ND(5)
Gross Beta	(pCi/l)	ND(8)	26	<8	15
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)

TABLE 1

PARAMETERS CHARACTERIZING
THE SUITABILITY OF THE GROUNDWATER AS A DRINKING WATER SUPPLY

(Continued)

	Units	12-23-83	3-14-84	6-20-84	9-27-84
Monitoring Well 3					
Arsenic	(mg/l)	0.013	<0.01	0.007	0.006
Barium	(mg/l)	0.15	<0.2	ND(2)	0.23
Cadmium	(mg/l)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)
Chromium	(mg/l)	0.005	0.006	<0.01	<0.001
Fluoride	(mg/l)	0.3	0.3	0.3	0.4
Lead	(mg/l)	0.03	<0.01	<0.01	ND(0.01)
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	0.44	ND(0.01)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	0.01
Silver	(mg/l)	ND(0.003)	0.005	<0.003	0.005
Endrin	(ug/l)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.1)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(0.1)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.5)	ND(0.1)	ND(0.1)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.1)	ND(0.05)	ND(0.1)
Radium	(pCi/l	3	<3	<3	<3
Gross Alpha	(pCi/l)	8	6	<5	9
Gross Beta	(pCi/l	ND(8)	11	<8	16
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)
Monitoring Well 4					
Arsenic	(mg/l)	ND(0.001)	<0.01	0.001	0.001
Barium	(mg/l)	0.22	<0.2	ND(2)	<0.2
Cadmium	(mg/l)	ND(0.003)	<0.003	ND(0.003)	ND(0.003)
Chromium	(mg/l)	<0.005	0.010	ND(0.01)	ND(0.005)
Fluoride	(mg/l)	0.1	0.2	0.20	0.2
Lead	(mg/l)	0.02	<0.01	<0.01	ND(0.01)
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.01	ND(0.01	<0.01
Silver	(mg/l)	ND(0.003)	0.013	0.004	0.012
Endrin	(ug/l)	ND(0.1)	ND(0.1)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.1)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.5)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.20)	ND(0.1)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	8	<3	<3
Gross Alpha	(pCi/l)	ND(5)	7	<5	ND(5)
Gross Beta	(pCi/l)	ND(8)	19	<8	9
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)

ND( ) Not detectable at the detection limit enclosed by the parentheses.

< Positive result at an unquantifiable concentration below indicated level.

TABLE 6

ASSESSMENT MONITORING STEP ONE: 9-24-85

	Units	1	2	3	4
Sodium	mg/l	61	48	62	62
Chloride	mg/l	38	40	36	56
Sulfate	mg/l	46	68	380	31
Bicarbonate	mg/l	100	470	210	480
Carbonate	mg/l	ND(1)	ND(1)	ND(1)	ND(1)
Iron (total)	mg/l	3.3	8.3	1.9	0.29
Manganese (total)	mg/l	0.92	1.5	0.64	2.1
Phenols	ug/l	7	4	8	4
Fluoride (total)	mg/l	0.3	0.4	0.5	0.3
Arsenic (total)	ug/l	<1	13	3	<10
Barium (total)	mg/l	0.84	0.35	0.42	1.0
Cadmium (total)	mg/l	<0.01	<0.01	<0.01	<0.01
Chromium (total)	mg/l	<0.02	0.04	<0.02	<0.02
Lead (total)	mg/l	ND(0.05)	<0.05	<0.05	ND(0.05)
Mercury	ug/l	ND(0.2)	<0.2	ND(0.2)	<0.2
Selenium (total)	ug/l	<1	ND(1)	<1	<10
Silver (total)	mg/l	<0.02	<0.02	<0.02	<0.02
Benzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromodichloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromoform	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromomethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Carbon Tetrachloride	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chlorobenzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroethylvinylether, 2	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroform	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
cis-1,3-Dichloropropene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Dibromochloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1-Dichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)

TABLE 6

ASSESSMENT MONITORING STEP ONE: 9-24-85

(Continued)

	Units	1	2	3	4
1,1-Dichloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dichloropropane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Ethylbenzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Methylene Chloride	ug/l	20	21	14	11
1,1,2,2-Tetrachloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Tetrachloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trans-1,3-Dichloropropene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trans-1,2-Dichloroethylene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1,1-Trichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1,2-Trichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trichloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trichlorofluoromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Vinyl Chloride	ug/l	ND(1)	ND(1)	ND(1)	ND(1)

ND( ) Not detectable at detection limit enclosed by parentheses.

< Positive result at an unquantifiable concentration below indicated level.

TABLE 10

CHEMICAL ANALYSIS OF 10-23-85 GROUNDWATER SAMPLES

	Units	Blank	S1	S2	1	2	3	9	11A
Arsenic, total	ug/l	<2.0	<2.0	<2.0	4.4	4.5	<2.0	<2.0	2.8
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	<0.50	<0.50	<0.50	1.04	<0.50	<0.50	0.57	<0.50
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	<1.0	31	30	46	56	46	39	38
Bromide	mg/l	0.11	0.90	0.96	2.2	4.5	0.96	0.80	0.58
Chloride	mg/l	1.6	35	34	29	39	36	36	35
pH	S.U.	8.40	9.19	8.87	7.51	8.61	7.28	7.42	8.24

	Units	11B	11C	11D	12A	12B	12C	13A	13B
Arsenic, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	0.80	<0.50	0.55	<0.50	0.53	0.50	1.1	0.85
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	61	58	58	44	48	46	50	54
Bromide	mg/l	0.62	0.54	0.54	0.43	0.96	0.43	1.4	0.66
Chloride	mg/l	37	39	45	36	78	31	35	50
pH	S.U.	7.64	7.87	7.81	8.15	7.89	8.25	7.30	7.01

	Units	13C	14A	14B	15A	15B	16A	16B
Arsenic, total	ug/l	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	2.3
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	<0.50	0.80	1.1	<0.50	<0.50	<0.50	<0.50
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	46	71	61	40	42	41	35
Bromide	mg/l	0.38	1.5	0.62	0.29	0.59	0.54	0.43
Chloride	mg/l	25	97	36	20	36	35	36
pH	S.U.	7.50	6.86	6.67	7.70	7.49	7.17	7.40

< Not detected at the indicated detection limit.

SOURCE: REFERENCE NO. 64

PARAMETERS ESTABLISHING GROUND-WATER QUALITY

PARAMETER (UNIT)	WELL # 1 Upgradient X Downgradient ___				WELL # 2 Upgradient ___ Downgradient X				COMMENTS
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Chloride (mg/l)	54	46	40	50	34	39	42	41	
Iron (mg/l)	4.1	4.5	5.9	3.8	4.2	8.6	16	20	
Manganese (mg/l)	0.65	0.82	0.74	0.66	1.0	1.6	1.9	1.3	
Phenols (ug/l)	9	4	8	ND(4)	14	ND(4)	7	ND(4)	
Sodium (mg/l)	44	47	41	40	45	50	43	4.7	
Sulfate (mg/l)	760	870	1000	950	120	140	160	150	

PARAMETER (UNIT)	WELL # 3 Upgradient ___ Downgradient X				WELL # 4 Upgradient ___ Downgradient X				COMMENTS
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Chloride (mg/l)	39	43	47	44	45	44	55	46	
Iron (mg/l)	6.5	3.3	3.8	6.9	0.89	3.2	0.28	1.2	
Manganese (mg/l)	0.57	0.58	0.58	0.58	1.8	1.8	2.3	1.8	
Phenols (ug/l)	ND(4)	4	5	ND(4)	ND(4)	ND(4)	ND(4)	ND(4)	
Sodium (mg/l)	62	56	61	5.0	54	58	55	5.4	
Sulfate (mg/l)	220	280	300	320	1800	2200	2800	2800	

Q = Quarter

Q1 = December 22-23, 1984
Q2 = March 13-14, 1984
Q3 = June 20, 1984
Q3 = September 27, 1984

ND = not detectable at the detection limit enclosed by parantheses.

EPA Ident'' 'er MID-082 767 591

DRINKING WATER SUITABILITY PARAMETERS

PARAMETER (UNIT)	Upgradient X Downgradient ___ Well # 1				Upgradient ___ Downgradient X Well # 2				COMMENTS
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
Arsenic (mg/l)	<0.001	<0.01	0.001	ND(0.001)	0.014	<0.01	0.021	0.016	
Barium (mg/l)	0.19	<0.2	ND(2)	0.27	0.11	<0.2	ND(2)	0.14	
Cadmium (mg/l)	ND(0.003)	ND(.003)	ND(.003)	ND(0.003)	ND(.003)	0.003	<0.003	<0.003	
romium (mg/l)	ND(.005)	0.005	ND(.01)	ND(0.003)	0.005	0.013	ND(.01)	<0.001	
Fluoride (mg/l)	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.20	
Lead (mg/l)	<0.01	0.01	0.02	<0.01	0.05	0.05	0.04	0.06	
Mercury (mg/l)	ND(.0002)	ND(0.0002)	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N (mg/l)	ND(.01)	ND(.01)	ND(0.01)	ND(0.01)	ND(.01)	0.03	ND(0.01)	0.37	
Selenium (mg/l)	<0.01	<0.001	ND(0.01)	<0.01	<0.01	<0.001	ND(0.01)	0.017	
Silver (mg/l)	ND(.003)	0.006	0.004	0.008	ND(.003)	0.005	ND(0.003)	<0.003	
Endrin (ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Lindane (ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Methoxychlor (ug/l)	ND(.5)	ND(.50)	ND(.50)	ND(0.50)	ND(.5)	ND(.50)	ND(0.50)	ND(0.50)	
Toxaphene (ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D (ug/l)	ND(20)	ND(.50)	ND(.10	ND(0.10)	ND(20)	ND(.50)	ND(0.10)	ND(0.10)	
2,4,5-TP Silvex (ug/l)	ND(.2)	ND(0.10)	ND(.05)	ND(0.10)	ND(.2)	ND(.10)	ND(0.05)	ND(0.10)	
Radium (pCi/l)	ND(3)	< 3	<3	< 3	ND(3)	4	< 3	<3	
Gross Alpha (pCi/l)	9	< 5	<5	5	ND(5)	8	< 5	ND(5)	
Gross Beta (pCi/l)	ND(8)	< 8	<8	18	ND(8)	26	< 8	15	
Coliform Bacteria (/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.

EPA Identifier: MID-082 767 591

DRINKING WATER SUITABILITY PARAMETERS

PARAMETER (UNIT)	Upgradient ___ Downgradient X Well # 3				Upgradient ___ Downgradient X Well # 4				COMMENTS
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
[illegible]senic (mg/l)	0.013	<0.01	0.007	0.006	ND(.001)	<0.01	0.001	0.001	
Barium (mg/l)	0.15	<0.2	ND(2)	0.23	0.22	<0.2	ND(2)	<0.2	
Cadmium (mg/l)	ND(.003)	ND(.003)	ND(0.003)	ND(0.003)	ND(.003)	<0.003	ND(.003)	ND(.003)	
Chromium (mg/l)	0.005	0.006	<0.01	<0.001	<0.005	0.010	ND(.01)	ND(0.005)	
Fluoride (mg/l)	0.3	0.3	0.3	0.4	0.1	0.2	0.20	0.2	
Lead (mg/l)	0.03	<0.01	<0.01	ND(0.01)	0.02	<0.01	<0.01	ND(.01)	
Mercury (mg/l)	ND(.0002)	<0.0002	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N (mg/l)	0.44	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)	
Selenium (mg/l)	<0.01	<0.001	ND(0.01)	0.01	<0.01	<0.01	ND(0.01)	<0.01	
Silver (mg/l)	ND(.003)	0.005	<0.003	0.005	ND(.003)	0.013	0.004	0.012	
Endrin (ug/l)	ND(.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Lindane (ug/l)	ND(.1)	ND(0.10)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Methoxychlor (ug/l)	ND(.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(.5)	ND(0.5)	ND(.50)	ND(0.50)	
Toxaphene (ug/l)	ND(1.0)	ND(1.0)	ND(0.1)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D (ug/l)	ND(20)	ND(0.5)	ND(0.1)	ND(0.1)	ND(20)	ND(0.5)	ND(.10)	ND(0.10)	
2,4,5-TP Silvex (ug/l)	ND(0.2)	ND(0.1)	ND(.05)	ND(0.1)	ND(0.20)	ND(0.1)	ND(.05)	ND(0.10)	
[illegible]adium (pCi/l)	3	<3	<3	<3	ND(3)	8	<3	<3	
Gross Alpha (pCi/l)	8	6	<5	9	ND(5)	7	<5	ND(5)	
Gross Beta (pCi/l)	ND(8)	11	<8	16	ND(8)	19	<8	9	
Coliform Bacteria (/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.

SOURCE: REFERENCE NO. 83

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

A. GENE GAZLAY, Director

Pointe Mouillee State Game Area
RFD #2
Rockwood, Michigan 48173
August 27, 1974

Mr. D.A. Nebrig
Chief Engineer
Michigan Seamless Tube Company
South Lyon, Michigan 48178

Dear Mr. Nebrig:

Spectrum numbers 3083 thru 3088 cover the period from 3-19-74 to 3-21-74. In order to understand the tracings it is necessary to compare them to each other or a standard.

The tracings are all very similar and appear to be from the same source.

Spectrum numbers 3406 thru 3410 cover the period 3-22-74 thru 3-23-74. These tracings appear to be identical. The sample analyses indicate that the oil at Dixboro Road and the oil found under the floor inside the plant is the same.

If you need further help or information, please feel free to contact this office.

Yours Truly,

WATER RESOURCES COMMISSION

Wayne E Denniston

Wayne E. Denniston, P.E.
Basin Engineer

cc: J. Bohunsky
WD:gm

MICHIGAN

could be determined. Also, our investigation was to investigate and determine both the horizontal and vertical limits of the oil seepage to insure that the pipe would intercept the fuel seeping toward Yerkes Drain.

During our initial meetings and discussions, and prior to our preparation of the investigation program, information obtained from previous investigations was made available to us. Basically, the information consisted of data obtained by Michigan Seamless Tube Company personnel and by an outside consultant. Information by Michigan Tube personnel consisted of the making of test holes in the plant floor and along the north bank of Yerkes Drain. These test holes provided preliminary information on the limits of the fuel oil. Additional information was obtained by U. W. Stoll Associates during their investigation performed in May of 1974. As part of that investigation, three test borings were drilled by Raymond International, Inc., at the locations shown on our Test Pit Location Plan, Plate 1. Also, 6 inch diameter steel casings were lowered into the hole for future ground water level observations. From that investigation, it was concluded that the ground water profile generally falls from north to south, with ground water movement toward Yerkes Drain. Also, the on-site soils were determined to be generally sands and gravels sufficiently permeable to allow the fuel oil to essentially "ride" over the ground water, toward Yerkes Drain. Based on these findings, the general concept of the 24 inch perforated pipe interceptor was formulated. Since all the data from the previous investigations are available to the owner and to Hoyem Associates, Inc., those data are not included with this report.

Based on the project's requirements, and on the available information, our firm prepared a program for obtaining the required information. We planned to utilize test pits along the proposed pipe location to determine water seepage rates and presence of the fuel oil. If this procedure were to prove unsatisfactory due to excessive caving of the test pits, test borings were then going to be utilized. In addition, depending on conditions encountered, soil samples were going to be analyzed for presence of oil by a testing laboratory.

On October 1, 1974, eight test pits (Nos. 1 through 8) were excavated at the locations shown on the Test Pit Location Plan, Plate 1. All test pits were excavated by the use of a backhoe provided by Merle Farley under the full-time supervision of our firm's personnel. During the course of the excavations, our representatives classified subsoils encountered, determined ground surface elevations at test pit locations, noted ground water and oil data, took representative soil samples, performed permeability tests, and provided overall direction of the excavation procedures. The pits were excavated to depths ranging from 8 feet to 11 feet. Several test pits were left open for several hours for water level observations while others were immediately backfilled upon completion due to excessive caving of the test pit sides. Subsequent to final water level observations and measurements, all test pits with the exception of Test Pit No. 3 were backfilled with the excavated soil.

Subsoil conditions disclosed by the test pits have been evaluated and are presented herein in the form of individual Logs of Test Pits for each pit, Figures 1 through 8. These logs present the stratigraphy of the soils encountered, sample data, water and oil conditions, personnel involved and other pertinent information. All our elevations are based on a datum provided by Hoyem Associates, Inc. Specifically, our elevations are referenced to the top of casing of Test Boring No. 1 by Raymond International, taken as Elevation 913.48.

The investigation was begun at the west end of the site with Test Pit No. 1. Based on previous information, presence of fuel oil was not expected at this location; however, when oil was encountered, Test Pit No. 2 was excavated at a point further west, as shown on Plate 1. A minimal inflow of oil was noted within this test pit also. However, due to the existence of gas lines and closeness of railroad tracks further west of this location, it was decided to leave this pit open for observation and continue the investigation to the east. All the subsequent holes excavated on October 1, with the exception of Test Pit No. 6, indicated the presence of fuel oil. Of particular note, heavy oil flows were observed in Test Pit No. 3, where approximately 200 gallons of oil were actually pumped out in approximately 15 minutes, and Test Pit No. 5. During the course of the day, water seepage information was obtained in three test pits left open for such observations.

COPY

Although considerable information was obtained during the course of the day, it was deemed desirable to be able to monitor ground water level as well as presence of fuel oil at later dates. Therefore, a 4 inch diameter perforated plastic pipe was installed in each of three test pits (Nos. 2, 4 and 6) for later observations. It should be noted that the three steel casings previously installed by Raymond International were found to be plugged at the bottom, and reliable ground water and oil data could not be obtained from them. Test Pit No. 3 was left open so that Michigan Seamless Tube Company could subsequently pump additional oil from this location.

The following week, our firm obtained additional oil and ground water data. This information, presented as Plate 2, and the findings from our investigations were discussed on October 8, 1974, with Mr. Jim Partridge of Hoyem Associates, Inc. As a result of our findings, certain revisions were made to the proposed interceptor system, most importantly an extension of the system to the east and a revision in the pipe slope. All the findings were then discussed at a meeting held on October 9, 1974 at Michigan Seamless Tube Company offices. The meeting was attended by Messrs. Dick Russell, Ken Dodds, Don Nebrig, Marv Brickey, Dave Usher, Jim Partridge and the writer. At that meeting, preliminary data obtained by our firm was discussed relative to the proposed interceptor system and the general project's requirements. At that meeting, certain recommendations or decisions were made, as follows:

1. As already mentioned, the proposed pipe would be extended further east.

2. The ground water data indicated that the groundwater table has a downward gradient from east to west as well as from north to south. Therefore, the slope of the east-west pipeline interceptor was revised to closely parallel the groundwater table east-west gradient.

3. The writer reported that, based on ground water data obtained during our investigation, ground water and oil flows that could be expected to flow into the pipe interceptor were on the order of approximately 5 to 100 gallons per minute, with flows in the lower range being most likely.

4. The bottom of oil encountered extended below the lower limits of the proposed pipe. Therefore, in order to prevent oil flow toward Yerkes Drain, a positive barrier must be provided at the pipe location, as originally shown on the design plans.

5. Since the westerly limit of oil seepage had not been exactly determined, it was considered necessary to conduct an additional investigation toward the west end of the site.

6. In view of the large quantity of oil seeping into Test Pit No. 3, the test pit was to be enlarged and a simple wooden box bracing system was to be installed to prevent cave-in of the pit sides, to allow installation of an oil skimmer to pump the oil to a storage tank.

COPY

Our firm made arrangements for Mr. Merle Farley to enlarge Test Pit No. 3 and construct the required bracing system on October 10, 1974. At that time, Marine Pollution installed and began operation of the oil skimmer system.

On October 11, 1974, five additional holes were made at the west end of the site. The test holes (Test Pit Nos. 9 through 13) were excavated at the locations shown on the Test Pit Location Plan, Plate 1. Test Pit Nos. 9 through 12 were excavated with a backhoe under the supervision of our field engineer. Test Pit No. 13, because of obstructions existing in that general area, could not be excavated with a backhoe and was made by our engineer utilizing a 6 inch diameter bucket auger. In all the holes, a 4 inch diameter perforated plastic pipe was installed for later ground water and oil observation. It should be noted that no clear evidence of fuel oil was disclosed during the excavations of these test pits. Subsoil conditions disclosed by the test pits are presented as Figures 9 through 13.

On October 14 and 15, additional water and fuel levels were obtained. Of note was that Test Pit No. 6, which for several days had indicated no presence of oil, now contained oil accumulation within the pipe. No oil was evident in the last five test pits made; however, these measurements were considered inconclusive by our firm, since heavy rains which might have affected the results had fallen on October 13 and 14. Therefore, as we reported at a meeting held on Tuesday, October 15, 1974, we would make additional readings on Friday, October 18 to obtain more reliable information. It was also agreed that we would prepare a final report based on the data obtained on that date. At the aforementioned meeting of October 15, 1974, attended by Messrs. Russell, Dodds, Nebrig, Brickey, Partridge, and the writer, it was also agreed that the writer would contact Messrs. Partridge and Brickey after obtaining the Friday water readings. This was to advise them whether any significant changes in water and oil levels had occurred, possibly resulting in revisions to the collector system design. At the meeting, the possibility of extending the collector system to the northwest was also discussed, in the event that subsequent monitoring of the observation pipes indicated oil seepage beyond the western limits of the proposed system. Also of note was that your firm had decided to excavate an additional pit and, as in Test Pit No. 3, pump oil from it at as fast a rate as possible, hopefully to deplete the major source of oil seepage prior to the installation of the collector system. At our suggestion, the new pump pit was excavated and constructed in the area of Test Pit No. 5, where a large inflow of fuel oil was noted at the time of the field investigation.

Our firm made a complete check of all installed pipes on October 18, 1974 and discovered inconsequential changes in the ground water and oil data reported at our meeting of the 15th. As agreed, this information was relayed to Messrs. Partridge and Brickey on the same day. Also, those data are presented herein as Plate 3.

Based on all the available information from previous investigations, from data obtained by our investigation, and from discussions with members of your firm and Mr. Jim Partridge of Hoyem Associates, Inc., the following summarizes our findings, observations, and recommendations:

1. The subsoils encountered on the site are generally granular in nature and, therefore, have relatively high permeabilities. However, as indicated on the individual test pit logs, the materials encountered below the groundwater table vary from fine sands with traces of clay to more coarse sand and gravel strata. In Test Pit Nos. 3 and 5, for example, where the largest inflow of oil was noted, the materials below approximately a 4 foot depth consist of a medium to coarse sand with some gravel, which have relatively high permeabilities. In Test Pit No. 2, however, sufficient clay binder was present in the subsoils that the permeability of these materials would be markedly lower. An even larger percentage of clay was noted in subsoils encountered at the west end of the site (Test Pit Nos. 10, 11 and 12). Thus, soil permeabilities can be expected to vary widely along the proposed length of the interceptor.

   Results from our field permeability tests in the various soil strata indicate permeability values ranging from approximately .0001 feet per minute to .002 feet per minute. Based on these values, and assuming a pipe length of approximately 450 feet, a flow of approximately 5 to 100 gallons per minute could be expected at the outlet end of the pipe. However, based on available information, we expect that flows will most likely be in the lower range of the estimated values (i.e., 5 to 10 gallons per minute).

2. In view of the visual observation allowed by the test pits, and based on the information obtained during the investigation and from the observation pipes installed in several of the test pits, it was not considered necessary to conduct laboratory tests on

soil samples to determine presence of oil.

3. Information developed during this investigation has disclosed that the general gradient of the groundwater table is in a southwest direction, toward Yerkes Drain.

Observed ground water conditions are presented as Ground Water Profiles, Plates 4 and 5. Plate 4, which represents the east-west profile, indicates that the top of fluid (oil) generally parallels the ground surface profile at approximately a 5 foot depth. Top of ground water (and therefore thickness of oil) was noted to vary throughout the length of the investigation. Plate 5, which represents an average ground water condition in a south-west direction, was developed from previous and present data.

C O P Y

It is our belief that the top of oil profile represents the approximate level of the natural groundwater table (i.e., if the oil were removed). Therefore, it is expected that, as the oil is collected and removed, the thickness of oil will decrease and the top of ground water level will rise to approach the present top of oil level. As the oil source is depleted, the groundwater table will again approximately coincide with the original level, prior to the oil seepage.

4. As shown on Plate 4, the bottom limit of oil along the path of the proposed pipe presently extends below the bottom of the proposed pipe. Therefore, to prevent the oil from bypassing the collector system, a positive barrier extending to approximately Elevation 904 should be provided. Such a barrier, consisting of a continuous P. V. C. liner, has already been incorporated in the design.

5. The proposed collector system calls for the excavation of a trench to approximately Elevation 903, installation of the P. V. C. barrier, backfilling of the trench to the proposed pipe bedding elevation, installation of the pipe, and backfilling over the pipe to meet existing grade. In the initial stages of operation for the completed system, it is expected that the bottom of oil will extend below the invert of the pipe, and will collect behind the P. V. C. barrier, within the pea gravel. As the oil source is depleted, the oil thickness should decrease and the oil collected within the pea gravel should rise above the invert of the pipe, from where it will be discharged into the collecting chamber. However, in the event that the groundwater table should for some reason lower to below the invert of the pipe, provisions should be made to allow collection of the oil existing within the pea gravel, behind the P. V. C. barrier. At one of the meetings, the writer recommended that a vertical slot be constructed on the collecting manhole wall, extending from the invert of the pipe to the bottom of the manhole. This slot could be plugged and kept inoperative during periods of normal ground water conditions. If the groundwater table were to lower, however, the slot could be opened to allow seepage of oil and water contained within the pea gravel trench into the collecting manhole. We understand that such provision has been incorporated in the design.

6. Information obtained on October 18, 1974 indicated that oil was absent at the locations of Test Pit Nos. 9 through 13. However, we do recommend periodic monitoring to check for presence of oil. The proposed collector system could then be re-evaluated based on the later information.

7. Pumping from Test Pit Nos. 3 and 5 should continue at as rapid rate as possible, so as to pump as much fuel as possible from the area prior to the installation of the collector system.

8. The excavations required for the construction of the proposed system will extend below the groundwater table. In view of the relatively high permeability of the subsoils, it is expected that large volumes of water will flow into the excavation. Therefore, it is recommended that positive ground water control measures be undertaken during the installation of the proposed system. Consideration should be given to the use of wellpoints or deep wells to temporarily lower the groundwater table during construction.

COPY

We hope that this report provides all the required information. If you have any questions regarding any of the items in this report, or should you require additional information, please do not hesitate to call on us. We appreciate the opportunity of being of service to you on this project.

Very truly yours,

HALPERT, NEYER & ASSOCIATES

Benedict Tiseo

Benedict Tiseo, P.E.

BT/cfl

Enclosures

cc: Mr. Jim Partridge

SOURCE: REFERENCE NO. 103

Quanex Corporation
400 McMunn
South Lyon, Michigan 48178
(313) 437-1715

Quanex

June 29, 1981

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Office of Hazardous Waste Management
Box 30038
Lansing, MI 48909

Attention: Ron Waybrant

Gentlemen:

Enclosed is our Waste Characterization Report, with an enclosure from an independent laboratory, E.R.G. Associates of Ann Arbor, Michigan. All questions have been answered except Section D, 6c. We have not conducted this test since we were unaware of the necessity. Should you feel it so we will be obliged to conduct it. With our test result being at a minimum or non-detectible to critical constituents, we would hope that we could gain approval to start removal of our by-product to the landfill now.

Sincerely yours,

QUANEX CORPORATION
MICHIGAN SEAMLESS TUBE DIVISION

M. P. Robinson

M. P. Robinson
Environmental Engineer

MPR/ad

Enclosure

RECEIVED
JUN 23 1981
ACT 64

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF ENVIRONMENTAL QUALITY
SOLID WASTE ADMINISTRATION
32 EAST HANOVER STREET, TRENTON, N.J. 08625

JACK STANTON
DIRECTOR

LINO F. PEREIRA
ADMINISTRATOR
SOLID WASTE MANAGEMENT

June 16, 1981

MS. R. Garrison
Michigan Service Division
Office of Hazardous Waste Mgt.
P.O. Box 30038
Lansing, Michigan 30038

Dear Ms. Garrison:

This letter is to confirm our meeting on Monday, June 26, 1981, at 9:30 a.m.. If a conflict arises, please contact me prior to Friday, June 19, 1981, as this is my scheduled departure date.

The purpose of my trip is to meet individually with officials from the states of Pennsylvania, Ohio, Indiana, Illinois and Michigan to discuss and share ideas concerning State Manifest Programs and Hazardous Waste Vehicle Registration. The State of New Jersey is in the process of redesigning its hazardous waste ADP system. As part of this process, we are addressing existing problems. I am anxious to discuss our program with you and see if we share any of the same problems, or to see if either of us have identified new problem areas. Some of the key points I am looking forward to discussing are:

1. Michigan and New Jersey's Manifest Program:
   a. General operations
   b. ADP capabilities
   c. Problems shared by New Jersey and Michigan and potential solutions
2. The possibility of sharing pertinent Manifest data:
   a. Periodic reports on the movement of hazardous waste between Michigan and New Jersey.
   b. Paper routes, tapes, telecommunications
3. The National Manifest Form:
   a. Its potential format
   b. Expected date of implementation

4. Michigan and New Jersey's Vehicle Reg ation Program
   a. General operation
   b. ADP capabilities
   c. Use by enforcement agencies
   d. Fleet registration
   e. Fee schedules

If you wish to discuss topics outside of the ones identified above, we can use this opportunity to do so.

I am looking forward to meeting with you and I am hopeful that this meeting will be beneficial to both of our programs.

Very truly yours,

David J. Lee

David J. Lee
Environmental Scientist

DJL:hjg

XC: Howard
Waybrant
Fore
Dennis

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

Great Lakes Environmental Services, Inc.
16099 Common Road
P.O. Box 396
Roseville, MI 48066
Attn: Mr. Dennis A. Gar[illegible], P.E.

January 14, 1981

Samples received 12-23-80

Samples taken 12-23-80

HYDRO NO:	44554	44555	44556
CUST. ID:	Drying Beds #1	Drying Beds #4	Drying Beds #5
Solids, Total, %	43.1	45.7	48.1
Solids, Total Vol., mg/kg	71,800	69,000	67,800
Non Combustible Ash, mg/kg	928,000	931,000	932,200
Lead, Pb, mg/kg	23	25	24
Zinc, Zn, mg/kg	3,400	3,700	3,900
Nickel, Ni, mg/kg	220	230	230
Copper, Cu, mg/kg	52	77	69
Beryllium, Be, mg/kg	< 0.2	< 0.1	< 0.2
Cadmium, Cd, mg/kg	2.0	1.5	1.5
Chromium, Total, Cr, mg/kg	250	290	290
Chromium, Hex., Cr, mg/kg	< 0.1	< 0.1	< 0.1
Mercury, Hg, mg/kg	< 0.1	< 0.1	< 0.1
Arsenic, As, mg/kg	3.9	6.0	4.4
Nitrogen, Kjeldahl, N, mg/kg	430	640	350
Phenol, mg/kg	0.2	0.1	0.2
Total Halogens, mg/kg reported as Chlorine	130	86	82
Bromine	29	31	35
Organic Halogens, mg/kg reported as Chlorine	110	48	47
Bromine	28	30	34

CLOW HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

Great Lakes Environmental Services, Inc.
16097 Common Road
P.O. Box 396
Roseville, MI 48066
Attn: Mr. Dennis A. Guritza, E.P.

January 14, 1981

Samples received 12-29-80

Samples taken 12-23-80

HYDRO NO:	44554	44555	44556
CUST. ID:	Drying Beds #1	Drying Beds #4	Drying Beds #5
Sulfur, S, mg/kg	4,010	8,310	7,980
Phosphorus, Total, P, mg/kg	2,120	3,410	3,410
Oil & Grease, mg/kg	3,300	2,200	3,030
Cyanide, Total, mg/kg	< 0.2	< 0.2	< 0.3
pH	7.72	7.80	7.81
Flash Point, °F	> 140 passes test	> 140 passes test	> 140 passes test

Results reported on sample as received.

Linda Carey

Linda Carey/Manager
Analytical Services

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF HAZARDOUS WASTE MANAGEMENT
BOX 30038
LANSING, MICHIGAN 48909

WASTE CHARACTERIZATION REPORT

SECTION A.
WASTE GENERATOR IDENTIFICATION INFORMATION

EPA IDENTIFICATION NUMBER: MID 08276 7591

BUSINESS NAME: Michigan Seamless Tube Division

ADDRESS: 400 McMunn Street

CITY: South Lyon, STATE: MI ZIP CODE: 48178

NAME AND TITLE OF CONTACT PERSON: Mel Robinson, Environmental Engineer

TELEPHONE NUMBER: (313)437-8117, Ext.140

SECTION B. COMMON NAME OF THE WASTE

ENTER TYPE OF WASTE (i.e. common name) characterized on this form and the source or process from which it was produced.

Dried Sludge Neutralized waste from Water Treatment

SECTION C. LISTED HAZARDOUS WASTE

	COMPONENT CONCENTRATION	HAZARDOUS WASTE NO.
1. If the waste is listed in tables 301 a, b, c, or d of Rule 299.6308, 299. 6309, 299.6310 or 299.6311, respectively or table 305 of Rule 299.6317, enter the hazardous waste number from the appropriate table		N/A
2. If the waste is a discarded commercial chemical product, off-specification specie, container or spill residue of a substance listed in Table 302a, Rule 299.6312, or Table 302 b or c, Rule 299.6313 or 299.6314, respectively, enter the hazardous waste number from the applicable table		N/A
3. If waste *contains* any substances listed in table 302 a, b, or c, Rule 299.6312, 299.6313, or 299.6314, respectively, enter their hazardous waste number(s) from the applicable table AND record the component concentrations.	___ to ___ %	N/A
	___ to ___ %	N/A
	___ to ___ %	N/A
4. If the waste contains viable desease-causing agents listed in table 304, Rule 299.6316, enter the hazardous waste number(s) from the table		N/A

SECTION D. HAZARDOUS WASTE BASED ON CHARACTERISTICS

5. Ignitable Wastes	Test Results	Parameters	Reference
5a. Liquid flash point test (aqueous solutions containing less than 24% alcohol by volume are excluded from this test).	> ≤ to 60 °c	Flash Pt. 60°c	299.6201 (c) (i)
5b. Non-liquid — Is it ignitable based on conditions stated in the reference?	☐ Yes ☒ No	See Reference	299.6201 (c) (ii)
5c. Compressed gas — Is the waste a flammable compressed gas as defined in the reference?	☐ Yes ☒ No	See Reference	49 CFR § 173.300
5d. Oxidizer — Is the waste an oxidizer as defined in the reference?	☐ Yes ☒ No	See Reference	49 CRF § 173.151
5e. Enter "D001", as the hazardous waste number if the waste exceeds one or more of the parameters listed or meets the definition of a hazardous waste based on the reference			N/A

6. Corrosive Wastes (concentrated salt solutions are by definintion not coorosive)	Test Results	Parameters	Reference
6a. Aqueous Solution — ph test	7.7 ph	See Reference	299.6201 (a) (i)
6b. Liquid-Steel (type SAE 1020) corrosion test	N/A mm/yr	Rate 6.35 mm/yr	299.6201 (a) (ii)
6c. Albino rabbit skin test — Is the tissue destroyed or irreversibly changed?	☐ Yes ☐ No	See Reference	229.6201 (a) (iii) & 49 CFR § 173.240
6d. Enter "D002", as the hazardous waste number if the waste exceeds one or more of the parameters listed			N/A

7. Reactive wastes

7a. Is the waste normally unstable and capable of undergoing violent chemical or physical change without detonating?	☐ Yes ☒ No
7b. Does it react with water forming potentially explosive mixtures with water?	☐ Yes ☒ No
7c. When mixed with water, does it generate toxic gases, vapors, or fumes?	☐ Yes ☒ No
7d. Is it a sulfide or cyanide bearing waste which when exposed to ph conditions between 2 and 12.5, can generate toxic gasses, vapors, or fumes?	☐ Yes ☒ No
7e. Is the waste capable of detonation or explosive reaction when subjected to a strong initiating source or if heated under confinement?	☐ Yes ☒ No

7f. Is the waste capable of detonation or explosive decomposition or reaction at standard temperature and pressure? ☐ Yes ☒ No

7g. Is the waste a forbidden explosive as defined in 49 CFR § 173.51? ☐ Yes ☒ No

7h. Is the waste a Class A explosive as defined in 49 CFR § 173.53? ☐ Yes ☒ No

7i. Is the waste a Class B explosive as defined in 49 CFR § 173.88? ☐ Yes ☒ No

7j. If the answer to any of the questions 7a through 7i is yes, enter "D003", as the hazardous waste number. N/A

8. EPA Toxic Wastes — Upon obtaining an extract of the waste as described on 40 CFR § 261, Appendix II, test for the components listed in Table 303, Rule 299.6315. For each component material that exceeds the extract concentration listed in the table, enter the hazardous waste number(s) and the tested concentration(s):

Hazardous Waste No.	Concentration
	N/A mg/l
	N/A mg/l
	N/A mg/l
	N/A mg/l

SECTION E. PHYSICAL STATE AT 25° C

9. What is the average density of the material? 686 Kg/cu. meter

10. Solids: Does the material produce dust if exposed to air movement? ☐ Yes ☒ No

11. Liquid — Sludge: What is the percent solids? ____ %

Do the solids settle out? ☐ Yes ☒ No

Can the material be pumped? ☐ Yes ☒ No

Can the material be poured.? ☐ Yes ☒ No

12. Liquid: At what temperature does it freeze? 0 °c

13. Gases: What is the maximum pressure of the container? N/A PSIG

SECTION F. OTHER INFORMATION:

14. What is the maximum quantity of this waste that is generated per month? 105,000 kg.

15. If the only hazardous waste numbers listed on this form are the numbers that have been entered for Item 3, enter the numbers in the space provided if the component concentration (Item 3) and the quantity of the waste generated (Item 14) cause the waste to be considered as a notification waste based on R 299.6201 (1) (g) (iii) and (iv), *figure A* of R299.6201(2), or *figure B* of R299.6201 (3): N/A N/A N/A

NOTE: If the hazardous waste numbers that have been entered under item 3, begin with the letter "P" use *figure A* to determine if it is a notification waste. If the number begins or ends with the letter "U" use *figure B*.

16. Are the hazardous wastes listed on this form disposed of onsite? No waste is disposed on siteN/A ☐ Yes ☐ No

17. If the waste is a hazardous waste, is it exempt under the small quantity exemptions pursuant to R 299.6203(2) and (3)? N/A ☐ Yes ☐ No

18. If tests were conducted in the evaluation of the waste, all of the following information shall be transmitted to the Department of Natural Resources with the waste characterization Record:

(a) The sampling procedure and the reasons for determining that the sample is representative of the waste.

(b) The results of all tests conducted.

(c) The accuracy and precision of any test conducted.

SECTION G. U.S. DEPT. OF TRANSPORTATION REPORTING REQUIREMENTS

Hazardous Materials Description and Shipping Name

Hazard Class UN/DA ID No.

Special Handling and Shipping Requirements

If the waste is hazardous and not exempt or excluded from management, or is a notification waste, send the completed form to the Department of Natural Resources, Office of Hazardous Waste Management, P.O. Box 30038, Lansing, MI 48909.

Signature Title Date

ERG sample number:	AA54869	
Sample description:	Dried Sludge	
Parameters and units	Results	detection limit
arsenic (mg/l)	0.025	
cadmium (mg/l)	ND	0.003
chromium (mg/l)	0.015	
lead (mg/l)	ND	0.010
barium (mg/l)	0.49	
mercury (mg/l)	ND	0.0002
selenium (mg/l)	0.001	
silver (mg/l)	0.009	
endrin (μg/l)	ND	0.090
lindane (μg/l)	ND	0.007
methoxychlor (μg/l)	ND	0.080
toxaphene (μg/l)	ND	0.61
2,4-D (μg/l)	ND	0.60
2,4,5-TP (μg/l)	ND	0.020

ND = non-detectable

U.S. ENVIRONMENTAL PROTECTION AGENCY

TECHNICAL ENFORCEMENT SUPPORT
AT
HAZARDOUS WASTE SITES

TES X

CONTRACT NO. 68-W9-007
WORK ASSIGNMENT NO.R05043

INTERIM FINAL REPORT FOR RCRA FACILITY ASSESSMENT (RFA) AT QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION SOUTH LYON, MICHIGAN

MID 082 767 591

U.S. EPA REGION V

METCALF & EDDY, INC.
PROJECT NO. 153043-0031-626

WORK PERFORMED BY:

METCALF & EDDY OF MICHIGAN, INC.
1101 WASHINGTON BLVD., SUITE 400
DETROIT, MICHIGAN 48226

AUGUST 1993

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EXECUTIVE SUMMARY

As a part of the PR/VSI conducted at the request of U.S. EPA, Metcalf & Eddy performed a preliminary review of federal and state file material for the Quanex Corporation - Michigan Seamless Tube facility (MID 082 767 591) and performed a visual site inspection of the facility. These activities were performed in order to summarize available information concerning the site and to assist the U.S. EPA in recommending further steps in the corrective action process. Quanex Corp. - MST is located at 400 McMunn St. in South Lyon, Michigan. The facility manufactures seamless steel tubing from round steel bars.

Manufacture of tubing at Quanex Corp. - MST produces an acidic wastestream which is lime stabilized on site. The stabilized waste was once pumped to two on-site surface impoundments where a lime stabilized sludge settled out of solution and water was discharged per NPDES permit to Yerkes Drain. The impoundments have since been replaced by a treatment plant with clarifiers and filter presses.

The two impoundments presently contain stabilized sludge from previous operations. Two sludge drying beds, which received periodic dredgings of sludge from the impoundments in the past, are also present at the facility. A fuel oil leak into Yerkes Drain from a below-grade pipe was discovered in 1974. A hazardous waste storage pad has been removed. A waste oil and solvent area is presently active. There is a waste pile/landfill for scrap equipment and materials on site. Also, scrap metal and drum debris has been found in a berm which separates the two surface impoundments.

Fifteen Solid Waste Management Units (SWMUs) were tentatively identified, based upon file reviews (see Table ES-1). Based on the VSI, the number of SWMUs was reduced to ten since many of the areas were found to be new/unused process material storage areas.

RELEASED
DATE 10/3/02
RIN #
INITIALS CW

ENFORCEMENT CONFIDENTIAL

TABLE ES-1

QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE
CURRENT SOLID WASTE MANAGEMENT UNITS

SOLID WASTE MANAGEMENT UNIT	OPERATIONAL DATES	RELEASE HISTORY
* Surface Impoundments	1970-1988	- Sludge to drying beds from 1971-1987.
* Sludge Drying Beds	1970-1987	- None known.
* Former Acid Pits	1935-1969	- None known.
* Landfill/Wastepile	1967(?)-1977/1977-1985(?)	- None known.
* Uncovered Berm Debris	Unknown	- Unknown. Possible origin from Landfill/Wastepile.
Hazardous Waste Container Storage Facilities	*Area B: 1985-1989 *Area C: 1980-Present	- None reported. - None known.
Sulfuric Acid Storage Tanks	? - present	- None known.
Underground Storage Tanks for Gasoline and Fuel Oil	? - present	- None known.
Fuel Oil Tanks	? - present	- None known.
Oil and Lubricant Drum Storage Area	? - present	- None known.
Bonderite Storage Tanks	? - present	- None known.
PCB Transformers and Capacitors	? - present	- None known.
* Neutralization Plant	Unknown	- Discharge to surface impoundments, 1970-1988 and to clarifiers, 1988-present.
* Fuel Oil Release Area	1973-74 to present	- Release of 200,000 to 500,000 gallons of fuel oil was discovered March 9, 1974.
* Filter Press	1988-present	- None known.

*** Indicates SWMUs identified during the file review and confirmed during the VSI**

INTERIM FINAL REPORT
RCRA FACILITY ASSESSMENT (RFA)

FACILITY NAME: QUANEX CORPORATION - MICHIGAN SEAMLESS TUBE (MST) DIVISION, SOUTH LYON, MICHIGAN

LATITUDE: N42° 27' 21"
LONGITUDE: W83° 39' 45"

SITE CONTACT: CHARLES SIMPSON

PHONE: (313) 486-0100

EPA ID #: MID 082 767 591

1.0 INTRODUCTION

This section of the RCRA Facility Assessment (RFA) report covers the purpose and scope of the RFA process. It also describes sections of this report.

1.1 Background

This report was prepared by Metcalf & Eddy, Inc. under the Technical Enforcement Support (TES) X contract at the request of the United States Environmental Protection Agency (U.S.EPA) Region V. It describes the Preliminary Review (PR) of file material for the Quanex Corporation- Michigan Seamless Tube (MST) facility and the Visual Site Inspection (VSI) of the facility. These are the first two steps in conducting a Resource Conservation & Recovery Act (RCRA) Facility Assessment (RFA). The RFA is the first phase of a RCRA corrective action program and consists of a PR, VSI, and, if appropriate, a Sampling Visit (SV). The report summarizes available information about the site and will assist the U.S. EPA in recommending further steps in the corrective action process.

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) provide new authorities for the U.S. Environmental Protection Agency (EPA) to compel owners and operators of hazardous waste treatment, storage, and disposal facilities to take corrective actions for releases of hazardous wastes and hazardous constituents. These authorities apply to releases at facilities subject to the permitting requirements of RCRA Section 3005(e) and at facilities applying for RCRA permits. These amendments require EPA to address the need for corrective action for previously unregulated releases to air, surface water, soil, and groundwater, and to address the generation of subsurface gas. Section 3004(u) of RCRA allows EPA to require corrective actions after permit issuance through a schedule of compliance. Section 3008(h) allows EPA to require corrective actions through an enforcement action.

This report summarizes file information related to releases of hazardous waste at the Quanex Corporation -Michigan Seamless Tube (MST) Division facility located in Oakland County, Michigan (see Figure 1). Releases into all media are considered, including groundwater, air, surface water and soils, and subsurface gas releases. All areas of potential release are considered, but the focus is on SWMUs.

A Solid Waste Management Unit (SWMU) is defined as any discernable unit where solid wastes have been placed at any time from which hazardous constituents might migrate, regardless of whether the unit was intended for the management of a solid or hazardous waste.

The SWMU definition includes the following:

- RCRA regulated units, such as container storage areas, tanks, surface impoundments, waste piles, land treatment units, landfills, incinerators, and underground injection wells.

- Closed and abandoned units.

- Recycling units, wastewater treatment units, and other units that EPA has generally exempted from standards applicable to hazardous waste management units.

- Areas contaminated by routine and systematic releases of wastes or hazardous constituents, such as wood preservative treatment dripping areas, loading or unloading areas, or solvent washing areas.

METCALF & EDDY

Location of Facility
Oakland County, Michigan

SCALE: NONE

DATE
REVISION BY
DATE
APPROVED BY
DATE
DRAWN B

An Area of Concern (AOC) is defined as any area where a release to the environment of hazardous waste or constituents has occurred or is suspected to have occurred on a non-routine or non-systematic basis. This includes any area where such a release in the future is judged to be a strong possibility.

The list and description of the SWMUs and AOCs in the report may not be all inclusive. Furthermore, the fact that a SWMU was not identified in the report does not affect U.S. EPAs authority for corrective action for SWMUs which may not be contained in the report.

The central purpose of an RFA is to identify releases or potential releases requiring further investigation. According to EPA's RFA Guidance Document, the four purposes of an RFA are as follows:

1. To identify and gather information on releases at RCRA-regulated facilities.

2. To evaluate SWMUs and other AOCs for releases to all media and to evaluate regulated units for releases to media other than groundwater.

3. To make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.

4. To screen from further investigations those SWMUs that do not pose a threat to human health and the environment.

Metcalf and Eddy (M&E) performed a file review of the Quanex Corp - MST files at the Michigan Department of Natural Resources (MDNR) office located in Lansing, Michigan, and the U.S. EPA Region V RCRA files located in Chicago, Illinois. Fifteen SWMUs were tentatively identified based on the file information. M&E performed the VSI on September 5, 1990 to verify the file information and initial conclusions regarding the SWMUs and identify other SWMUs, if present. The M&E site inspectors, Brice Birkhofer and Thomas Pawlowski, were met by the following persons representing

Quanex Corp - MST: Mr. Charles Simpson, Quanex Corp. Chief Engineer; Mr. Donald Comfort, Quanex Corp. Engineering Manager; Mr. William Merchant, Quanex Corp. Plant Engineer; Mr. Dennis Hatfield, Principal of Patterson Schafer Inc., environmental consultants; and Mr. Roger Patrick, Quanex Corp. Counsel from Sonnenschein Nath & Rosenthal. Based on the VSI, the number of SWMUs and AOCs was changed from fifteen to ten because many of the initially identified areas were found to be new/unused process material areas. An example of this would be existing sulfuric acid process tanks. No new SWMUs were identified during the VSI. See Table 1.

1.2 Permit History

An NPDES Permit (MI 0001902) was issued to Quanex Corp. - MST on September 5, 1985 (69,72). Violations of permit regulations regarding monthly average phosphate and total solid limits have been reported on several occasions, as detailed in Section 3.5 of this report (6, 13).

On August 5, 1983, a Consent Agreement and Final Order (CAFO) was issued to Quanex Corp-MST regarding cessation of hazardous waste (HW) treatment, storage or disposal except per 40 CFR Part 265. The CAFO also ordered that compliance with Consolidated Permit Regulations in accordance with 40 CFR Parts 124 and 270 should be maintained, just as if timely submittal of a Notification of Hazardous Waste Activity and Part A Permit Application in 1980 had occurred (95). Quanex Corp. - MST then pursued an extension in submitting a Part B application due to the delisting of lime stabilized waste pickle liquor sludge from the hazardous waste list as of December 5, 1984 (85). Then, on February 4, 1985, another CAFO was issued concerning a complaint of violations of Section 3008 of the Solid Waste Disposal Act as amended by RCRA 42 USC Section 6928 and 40 CFR Part 22. The CAFO ordered Quanex Corp. - MST to achieve and maintain compliance with 40 CFR Part 265 and assessed a civil penalty (76).

1.3 Enforcement History

The Michigan Department of Natural Resources (MDNR) has conducted regulatory enforcement activities at this site. Based on file information and several site investigations, MDNR directed Quanex Corp-MST on October 28, 1986 to perform a remedial investigation (RI) of their sludge drying beds to determine

TABLE 1

SUMMARY OF SOLID WASTE MANAGEMENT UNITS

UNIT NAME	REGULATORY STATUS BEFORE VSI	REGULATORY STATUS AFTER VSI
Surface Impoundments	SWMU	SWMU
Sludge Drying Beds	SWMU	SWMU
Former Acid Pits	SWMU	SWMU
Landfill/Wastepile	SWMU	SWMU
Uncovered Berm Debris	SWMU	SWMU
Hazardous Waste Container Storage Facilities (2)	SWMU	SWMU
Sulfuric Acid Storage Tank	SWMU	NONE
Underground Storage Tanks for Gasoline and Fuel Oil	SWMU	NONE
Fuel Oil Tanks	SWMU	NONE
Oil and Drum Lubricant Storage Area	SWMU	NONE
Bonderite Storage Tanks	SWMU	NONE
PCB Transformers and Capacitors	SWMU	NONE
Neutralization Plant	SWMU	SWMU
Fuel Oil Release Area	SWMU	SWMU
Filter Presses	SWMU	SWMU

the extent of soil and groundwater contamination (52). The resulting investigation and monitoring by Quanex Corp - MST showed that the sludge was not inert as Quanex Corp. - MST had previously assumed, since leachate extraction and testing found lead and manganese in excess of primary and secondary drinking water standards. Therefore, the sludge was subject to the requirements of Public Act 641 (Solid Waste Management Act) (44).

On September 24, 1987, MDNR approved the August 5, 1987 revised closure plan for surface impoundments and container storage areas (39). During November, 1988, Quanex Corp - MST expanded their wastewater treatment facility and discontinued discharge of sludge to the surface impoundments (18, 28).

Quanex Corp - MST requested an extension of closure for the surface impoundments on November 2, 1988 and submitted a petition for Type III designation of the surface impoundment sludge in July, 1989 (8,18). Note that in Michigan, Type III wastes are wastes which have very low potential for groundwater release, whereas Type I wastes are characteristically hazardous and the definition of Type II wastes lies somewhere between, as defined in Michigan Acts 64 (Solid Waste Management Act) and 641 (Hazardous Waste Management Act). An amended closure plan for the surface impoundments was submitted on August 27, 1989 (4). MDNR issued a Notice of Deficiency on November 15, 1989 regarding certification of the HW Container Storage Unit Closure and in February, 1990, MDNR accepted a revised closure certification and released Quanex Corp - MST from financial responsibilities regarding the closed unit (1, 117).

1.4 Project Description and Report Format

This RFA report consists of six sections and five appendices. The information contained in the report is designed to give the reader a thorough description of site-specific and area conditions at the facility, and to provide information on individual units at the site. The following sections of the report are outlined below:

Section 2.0 describes the facility and its operations by providing general facility information, process information, waste management practices, and regulatory status of SWMUs at the site.

Section 3.0 provides information on the general environmental setting in the immediate area and in the region where the facility is located. The climate, surface water, groundwater, soils, geology, and land use in the vicinity of the site are described in this section. Pollutant releases into groundwater, surface water, air, soils, and subsurface gases are also discussed in this section.

Section 4.0 presents unit-specific information on SWMUs. For each SWMU status, description, period of operation, waste type(s) and management, release controls, release history, VSI observations, and sample results are provided.

Section 5.0 provides summary and recommendations, including a summary table for all SWMUs identified during the RFA.

Section 6.0 presents conclusions.

Finally, the appendices contains photographs taken during the visual site inspection, if available, field notes, and analytical data.

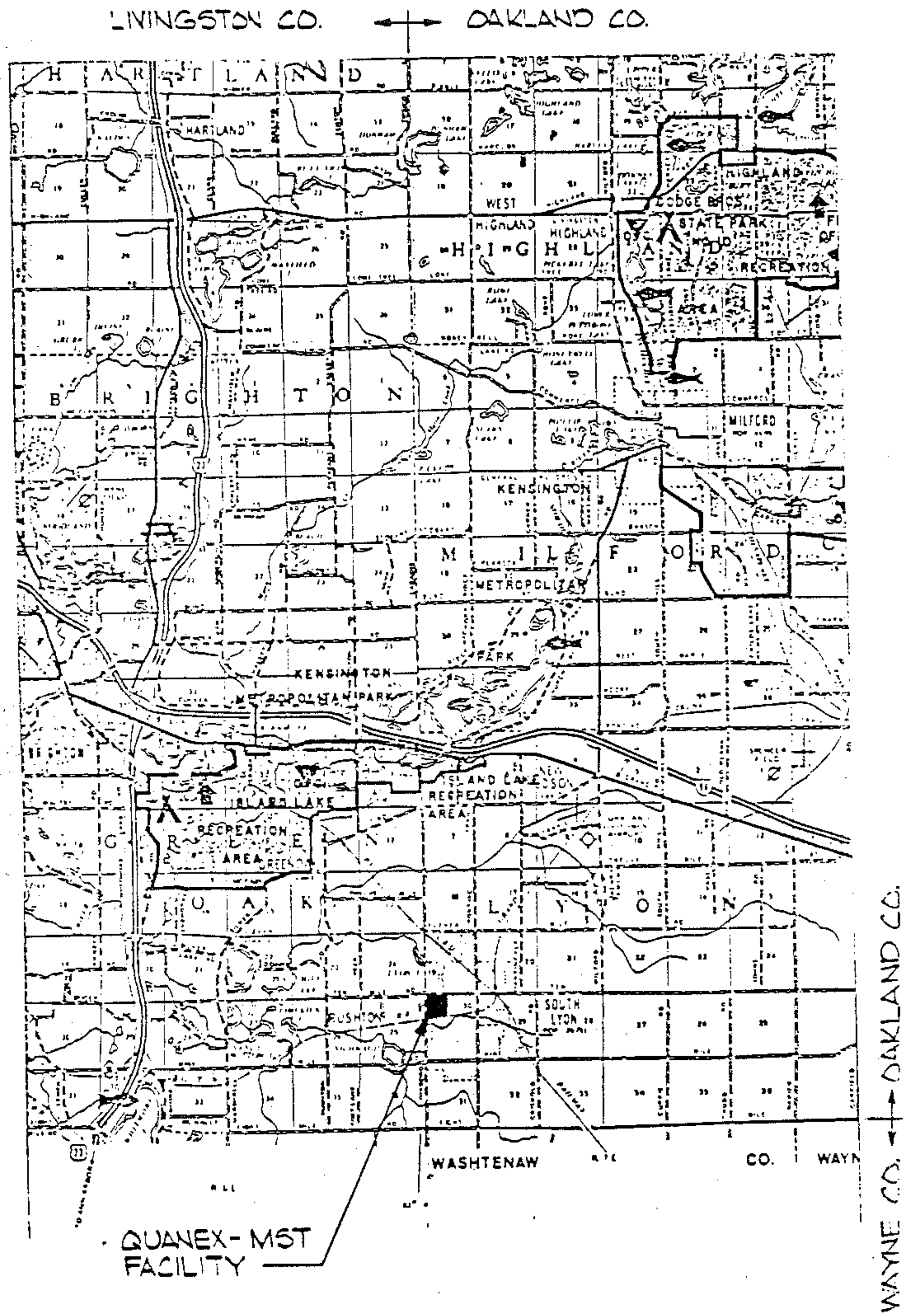
2.0 GENERAL DESCRIPTION OF FACILITY AND PROCESSES

Quanex Corp - MST manufactures seamless steel tubing from round steel bars. Hot and cold mill processes are used.

2.1 Facility Location and Operation

The Quanex Corp - MST Division is located on the southwest side of the City of South Lyon in Oakland County, Michigan. See Figures 1 and 2 for the county and facility locations, respectively. The site is bordered by Ten Mile Road on the north, McMunn Street on the east, the Grand Trunk Western Railroad right-of-way on the south and Dixboro Road on the west. The facility covers approximately 53 acres (75). Figure 3 shows a plan of the facility.

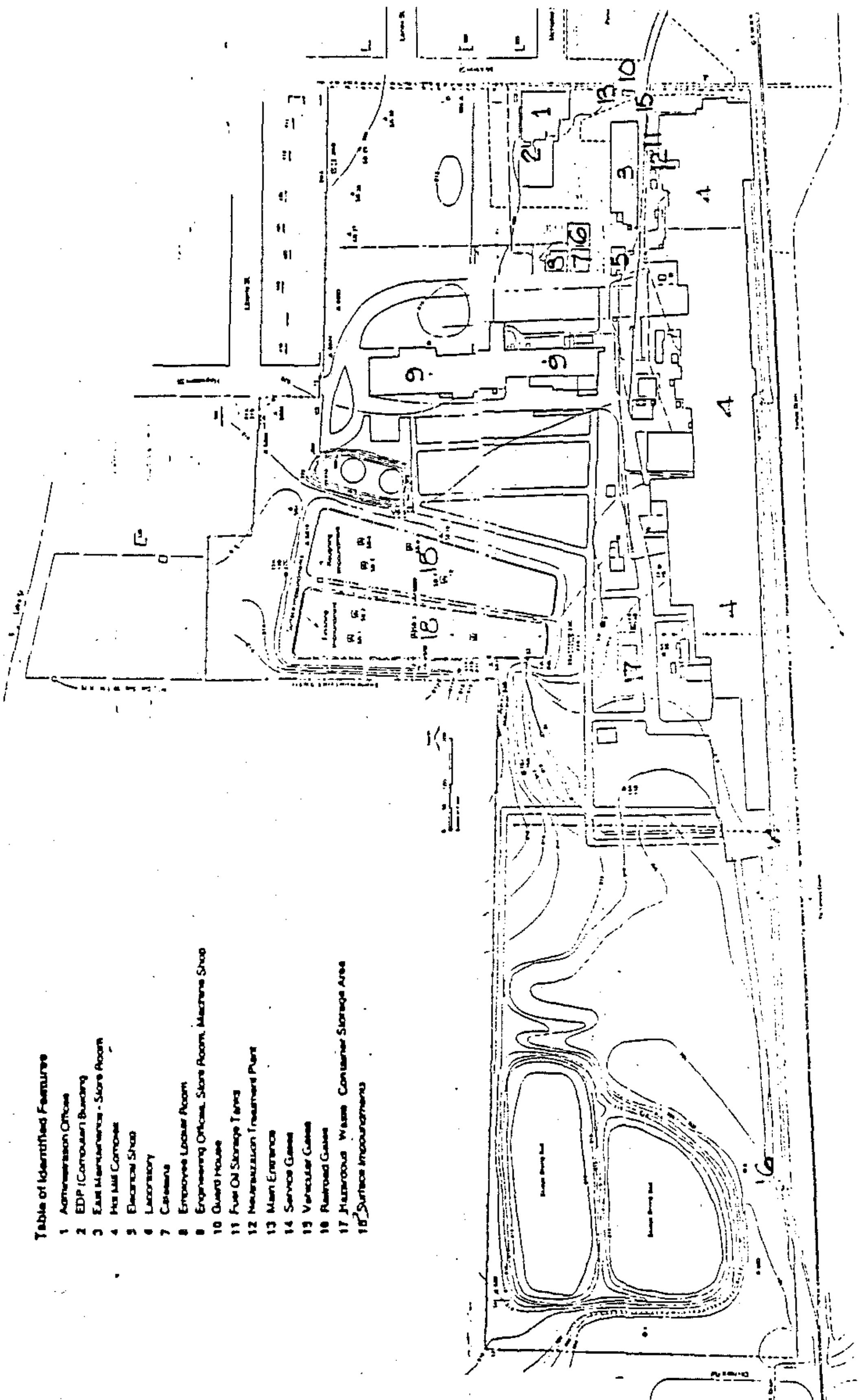
The facility manufactures seamless steel tubing by using hot and cold mill processes. During this process, round steel bars are heated, pierced and air cooled. After cooling, lubricants consisting of zinc



METCALF & EDDY

FIGURE 2: Location of Quanex-MST Facility in Oakland County

SCALE: NONE



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M&E METCALF & EDDY

FIGURE 3: Quanex MST Facility
Site Plan

SCALE: NONE

phosphate and sodium stearate elements are applied prior to cold-drawing of the tubing to the required dimensions. If further size reduction becomes necessary, annealing, acid pickle liquor cleaning, hot and cold water rinsing, and drying are performed (8). Tubing immersion in a cleaner/rust inhibitor is also possible. The processing operation produces approximately one million gallons of wastewater per day (59, 75).

Hazardous and non-hazardous wastes generated by the processes include waste pickle liquor, acid cleaning rinsewater, machine lubricating oils, salt pot waste, steel and metal scrap and commercial product residues in liners and containers (75). Solvents used in the cleaning of manufactured products are temporarily stored, and used and spent-wastes are drummed and temporarily stored before disposal (80).

Wastewater treatment at the plant includes metering of a lime slurry for flocculation and neutralization, aeration, and the settling and filter pressing of solid components (3, 54). Treatment equipment includes two clarifiers, two polymer feed systems, pH adjustment system, sludge thickener tanks, sludge filter presses, air compressor and pumps, piping, instrumentation, etc. (17). The treated wastewater is discharged through a NPDES permitted outfall to Inchwagh Lake via Yerkes Drain. Prior to November, 1988, wastewater was discharged into two surface impoundments before release into Yerkes Drain (75). Settled solids from the impoundments were placed in two sludge drying beds from 1970 to 1987 (33). Sludge produced after the 1988 expansion of the wastewater treatment plant has been disposed of offsite in a licensed Type II landfill.

3.0 ENVIRONMENTAL SETTING

Quanex Corp - MST is located immediately to the north of the Yerkes Drain. Some swampy areas are present along the north and western edges of the site. Inchwagh Lake and its surrounding wetlands are located one-half mile southwest of the site as shown in Figure 2. Residential properties are located to the northeast, east and southeast (75). Two municipal wells are located ¼ mile east-southeast of the facility (60).

3.1 Geology

In the South Lyon region, 300 to 400 feet of glacial drift overlies the Mississippian Coldwater Shale. Quanex Corp - MST is in an interlobate area, northwest of the Erie glacial lobe. In the north-northeast part of the site, 15-30 feet of outwash sand and gravel deposits rest on interbedded silt, sand and clay. In the southeast part of the site, only outwash deposits are found and are approximately 70 feet deep (22). The glacial drift is dominantly outwash, moraine deposits and other ice contact deposits including interbedded clays, sandy clays, or sand and gravel. The land surface generally slopes to the southwest from an elevation of 1000 feet approximately two miles northeast of the facility to 887 feet elevation, which is the surface of Inchwagh Lake. The estimated elevation of bedrock is 650 feet (60). Surface grade of the Quanex Corp -MST facility ranges approximately from elevation 910 feet to 920 feet (66).

3.2 Hydrogeology

Groundwater monitoring and well logs have indicated vertical and horizontal gradients through the outwash aquifer underlying the site. Groundwater elevations taken prior to closure have shown mounding of the water table under the two surface impoundments (22, 60). However, the present existence of such a mound is uncertain since the surface impoundments have not contained discharge waters since November, 1988 (18). The dissipation in elevation of the mound towards Yerkes Drain to the southeast was greater than the dissipation in elevation of the mound to the northwest because the outwash underlying the site to the north rests upon interbedded silts, clays and sands relatively close to grade. Groundwater hydraulic conductivity at this site ranging from 0.000011 to 0.0094 cm/sec has been found using monitoring wells as reported by Quanex Corp's consultant in the 1987 Annual Groundwater Monitoring Report (22). Groundwater flow velocity through the outwash aquifer away from this mound was estimated in the report to be 0.00075 ft/day and projected to possibly achieve an expected maximum of 0.22ft/day (32). An MDNR estimate of 4.5 ft/day for a groundwater flow immediately adjacent to the mound was developed, based upon a vertical gradient caused by the previous head of water in the impoundments (22).

3.3 Climate/Meteorology

Climate information available from the U.S. Department of Agriculture Soil Conservation Service indicates that an average annual windspeed of 5.1 meters per second from the prevailing southwesterly direction occurs in this general region. The average annual temperature is approximately 59° F and average yearly total precipitation is approximately 30 inches.

3.4 Pollutant Releases into Groundwater

On March 9, 1974, a Michigan Water Resources Commission investigation revealed an accumulation of oil in the Yerkes Drain and in the wetlands in the southwest corner of the Quanex Corp - MST facility. It was then determined that an old fuel line had ruptured, releasing an unknown volume of fuel oil to the surface of the groundwater table and into Yerkes Drain (36, 79). The release volume has been estimated to be anywhere from 200,000-300,000 gallons, at 420,000 gallons, and from 400,000 to 500,000 gallons (36, 57, 75). Figure 4 shows the area of effect of the release. On December 14, 1988, during sludge solidification activities, debris was discovered in the berm dividing the two surface impoundments (9,16). Sampling and testing by a consultant for Quanex Corp. - MST revealed the presence of no contaminants in the one groundwater sample taken which was analyzed for total metals and volatile organic scans 601 and 602. Analysis of six berm soil samples, three samples of solidified sludge and two soil samples from the finishing lagoon berm did find scattered levels of lead, chromium, toluene and 1,1,1 trichloroethane, when tested for total metals and volatile organic scans 601 and 602 (See Appendix A). The presence of low ppb levels and ranges of arsenic and 1,1-dichloroethane have been indicated by test results from monitoring wells near the western surface impoundments, neutralization treatment plant and downgradient of the fuel oil release area.

3.4.1 Release Potential

The fuel oil line has been disconnected from the present oil storage system (79). Cleanup and disposal activities for the debris located in the berm between the surface impoundments are awaiting MDNR approval of either a work plan or an amended closure plan.

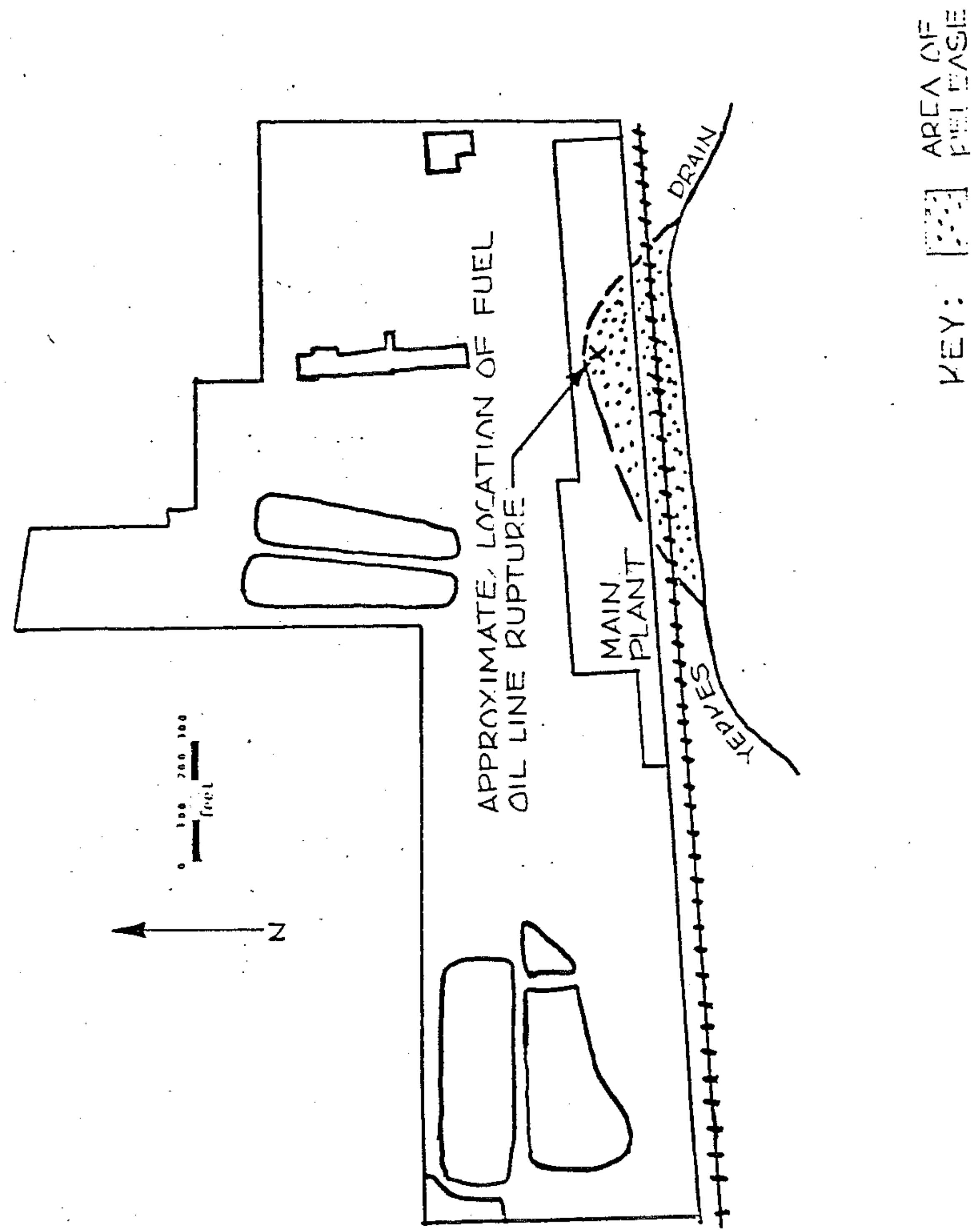

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FIGURE 4: Quanex MST Fuel Oil
Area Plan

SCALE: NONE

3.4.2 Monitoring Data

Initial remediation for the fuel oil release included placing a system of well points, pumping and disposal of the oil/water emulsion, and establishing monitoring wells to identify the affected area. The present groundwater monitoring system for the fuel oil release consists of monitoring wells and release control and fuel oil collection equipment. A remedial action plan was approved by MDNR and the Michigan Water Resources Commission (MWRC) for implementation of this monitoring and removal (75). Bi-annual reporting of fuel oil recovery since the release occurred has been performed and, as of December 30, 1987, approximately 290,000 gallons of fuel oil had been recovered. At that reporting, 10 gallons had been recovered over the preceding six months (35, 57, 79). Further action or remediation regarding the fuel oil spill beyond what has already been done was not documented in file information. Well points and soil and sludge samples were used to monitor the location of the contaminated debris in the surface impoundment berm, and no contamination was found in one groundwater sample (16). Groundwater monitoring at the site for interim status and in accordance with the Groundwater Quality Assessment Program have reported the presence of arsenic (3.7 - 9.2 ppb), copper (10-30 ppb), selenium (2.9 ppb), 1,1-dichloroethane (1.2 -5.3 ppb), iron and sulfate (32,47,60). Consultants to Quanex Corp. -MST have attributed the presence of arsenic, iron and sulfate to natural or offsite sources and 1,1-dichloroethane to well contamination (32, 46). In a 1988 Comprehensive Monitoring Evaluation (CME) performed by MDNR, the impact of the surface impoundments on groundwater quality was reported to be minor, although parameters in question, namely arsenic and 1,1 - dichloroethane, were present (22). Monitoring wells 3, 14A and 14B were covered during construction of the neutralization treatment plant and monitoring of wells 6A, 6B, 16A and 16B installed in their stead. See Figure 5 for site monitoring well locations and Appendix E for a compilation of testing data from the sources indicated.

3.4.3 Potential Receptors

Yerkes Drain and Inchwagh Lake are potential receptors. Two municipal wells are located 1/4 mile east-southeast of the facility, on the opposite side and upgradient of Yerkes Drain, and are therefore not a potential receptor.

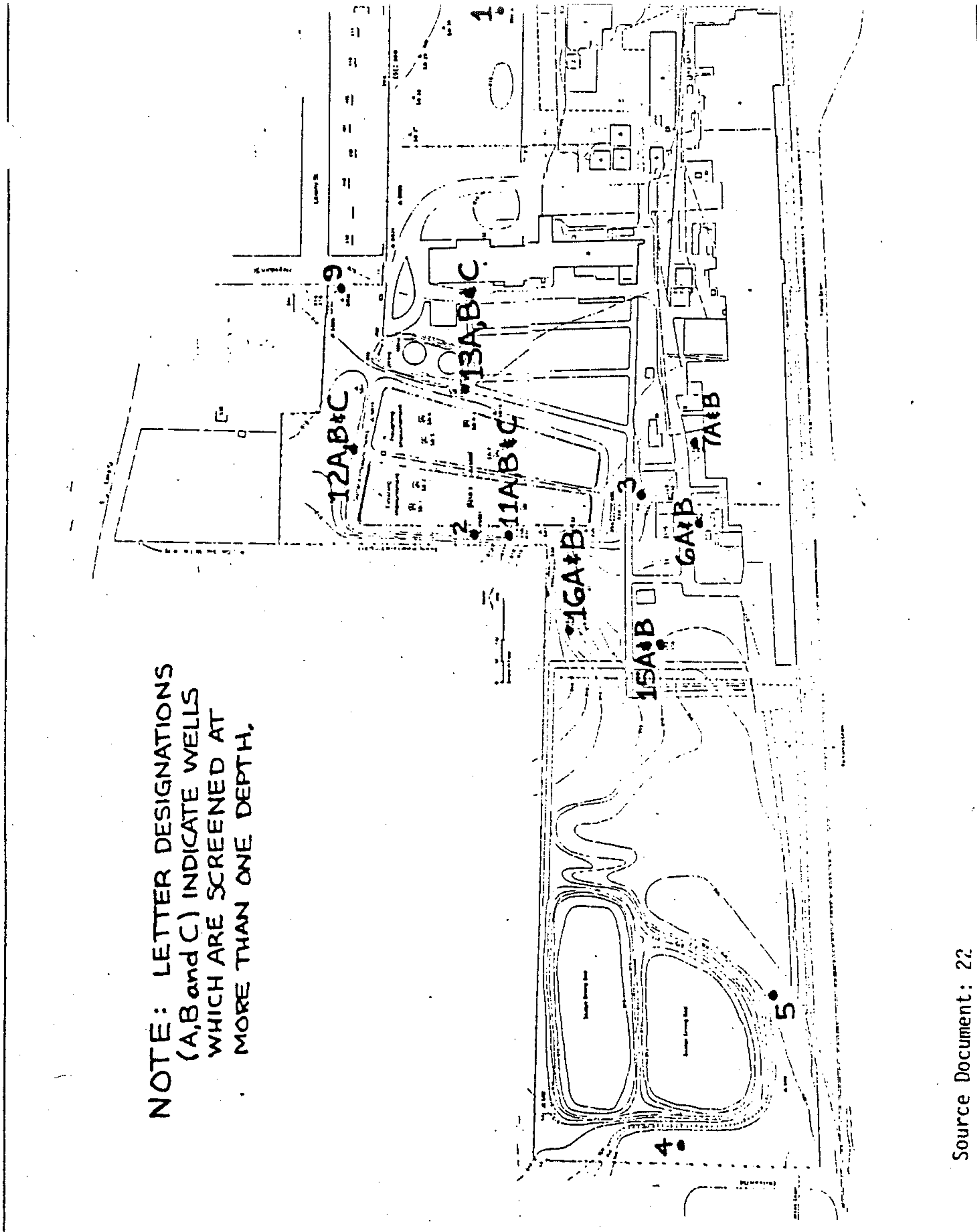

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FIGURE 5: Ground Water Monitoring Well Locations

SCALE NONE

3.5 Potential Releases into Surface Water

An oily film noticed in Yerkes Drain in early 1974 led to the discovery of a broken fuel line and a fuel oil release (36, 79). Quanex Corp -MST discharges treated process water into Yerkes Drain per NPDES permit. Several violations of this permit, including exceeding of limits set for suspended solids and total phosphorus, occurred from December 1988 through June 1989 (6,13). On August 22, 1989 a Notice of Non-compliance was issued by the MDNR Water Resources Commission, advising Quanex Corp - MST to return to compliance or face regulatory action (6).

3.5.1 Release Potential

The fuel oil line has been disconnected from the distribution header connected to the present supply system and release controls have been installed. NPDES Permit violations occurred after conversion from the use of large surface impoundments to using smaller volume clarifiers in the wastewater treatment process during November, 1988 (3). Quanex Corp. - MST reported that reduction in wastewater volume discharge with no reduction in process solids and phosphorus caused exceedence of permit limitations. A limitation of 20 mg/L and 110 lbs/day as monthly averages for total suspended solids was exceeded by 19 to 21 mg/L and 183 to 232 lbs/day for four months, and a monthly average limitation of 0.25 mg/L for total phosphorus was exceeded for six months by 0.02 to 0.16 mg/L (6). The conversion to clarifiers was also reported to affect monitoring and the ability to compensate for problems before discharge (3).

3.5.2 Monitoring Data

Daily samples are taken from the effluent and sent to the City of South Lyon Wastewater Treatment Plant (WWTP) for analysis. Results are recorded on bench sheets. Continuous-reading 24 hour strip charts are used to record pH. Records are available for the previous five years (10). Reporting of non-compliance events and submittal of Discharge Monitoring Reports are required in order to assure regulations are followed (3,6). Release control, collection and well monitoring for fuel oil are in place and small volumes of fuel oil, roughly 5 to 15 gallons, are typically collected during six month periods (35, 79). Monitoring well testing has found the fuel oil to be a high grade #1, #2 or #3 fuel oil (57).

3.5.3 Potential Receptors

Aquatic biota of Yerkes Drain and Inchwagh Lake are potential receptors.

3.6 Pollutant Releases into Air

Activity Reports from MDNR Air Quality Division (AQD) and VSI information indicate the following Quanex equipment is kept on their Emissions Inventory (EI): One packed tower acid mist scrubber for No.2 Pickle House; six acid pickle tanks, four with fan - drawn ventilation and two sharing two wet scrubbers; six roller hearth annealing furnaces; one lime silo with baghouse; two natural gas/oil boilers and rotary and walking beam reheat furnaces which share one stack (91, 94, 98, 101, 105, 107-110). No releases from these sources have been reported. A complaint was received on August 10, 1987 by a local resident regarding a woodburning/chemical odor, but no findings resulted when checked by MDNR-AQD on August 24, 1987 (41).

3.6.1 Release Potential

No reports of releases were present in the files or VSI information. Processes are presently operated with control equipment.

3.6.2 Monitoring Data

Visual (opacity) only as required.

3.6.3 Potential Receptors

The residential areas of South Lyon would be potential receptors.

3.7 Pollutant Releases into Soils

There have been six potential areas of pollutant release into soils reported. In late 1973 or early 1974, a buried fuel oil line ruptured, leaking fuel oil into the soil, as described in Section 3.4 (36). Waste barium and corrosive solids located within a hazardous waste storage pad (Area B)(43). Lead and manganese from the two sludge drying beds (44). Two surface impoundments previously used to collect sludge waste contain a variety of metals (8). Three waste pickle liquor acid pits which operated for 34 years were closed without formal cleanup (62). Berm debris uncovered December 14, 1988, between the two surface impoundments as described in Section 3.4 (9, 16).

3.7.1 Release Potential

The buried fuel line has been disconnected from the supply system but has not been removed. The line/release area is a source of release of approximately 5-10 gallons per six month period, but releases are contained by "primary" and "secondary" control measures. The hazardous waste storage pad has been acceptably closed per MDNR and closure activities determined that no releases had occurred (117). Two sludge drying beds and two surface impoundments are in various stages of delisting, disposal or closure. Sludge sample test data prepared by consultants to Quanex Corp. - MST appears to show that waste constituents in the lime stabilized waste pickle liquor sludge (LSWPLS) in the beds and impoundments is immobile (8, 33). Three waste pickle liquor acid pits were closed prior to 1968, before RCRA regulations were established, and these areas have been built over during plant expansions and closure/cleanup is not documented. The berm debris is still in place, awaiting MDNR approval for disposal.

3.7.2 Monitoring Data

Berm soil and dried sludge samples taken from the site by consultants to Quanex Corp. - MST indicate elevated levels of lead (0.1 - 3.6 mg/L), toluene (0.039 - 0.14 mg/kg), chromium (0.07 - 0.08 mg/L) and 1,1,1 trichloroethane (0.083 - 0.12 mg/kg) in certain locations (See Appendix A). Leachate testing of the impoundment and drying bed sludges has found no constituents in excess of E.P. Toxicity limits (8, 33). Drying bed sludge leachate samples have been found to exceed drinking water standard limits for manganese (0.04 to 1 mg/L detected) and for lead (0.11 to 0.47 mg/L detected) (44). Barium (1.1

mg/L), zinc (5.5 - 5.9 mg/L) and selenium (0.013 - 0.019 mg/L) at levels in excess of drinking water standards have been found in the impoundment sludge leachate, but are less than twice the allowable standard levels (8). See Appendix B for sample results for sludge and leachate constituent levels. Note that all test data recorded in the files was related to E.P. Toxicity testing, that no testing according to new TCLP procedures was evident, and that a sample could be non-hazardous under E.P. TOX criteria but fail to meet TCLP criteria.

3.7.3 Potential Receptors

Surface water, groundwater and terrestrial biota in or on the soil are potential receptors.

3.8 Gaseous Pollutants into Subsurface Soils

No sources are known.

3.8.1 Release Potential

Volatilization of organic contaminants, if present.

3.8.2 Monitoring Data

No data is available.

3.8.3 Potential Receptors

Ambient air is a potential receptor if subsurface gases migrate to the surface and are released from the soil.

4.0 DESCRIPTION OF SOLID WASTE MANAGEMENT UNITS (SWMUs)

Ten SWMU's are identified at the Quanex Corp-MST site. These include surface impoundments, sludge drying beds, former acid pits, landfill/ wastepile, uncovered berm debris, two hazardous waste container storage facilities, a fuel oil release area, two filter presses and a neutralization plant. See Figures 3, 4 and 6 for locations of the SWMUs and plant process areas.

4.1 Unit Type: Surface Impoundments

Regulatory status: SWMU. This area is inactive and undergoing closure (See Figure 6). A revised closure plan was conditionally approved September 24, 1987 (39). However, discovery of debris in the berm between the two impoundments, designation of the sludge as Type II waste by MDNR, and the submittal of a new closure plan for performing closure with sludge in place have left this issue awaiting MDNR consideration and approval/disapproval (4, 9, 12).

A. Unit Description: The two surface impoundments are each 550 feet long and tapered from 125 feet to 50 feet end to end. The total depth of the impoundments was uncertain, due to previous dredging of sludge into the sludge drying beds, but sludge depth in the finishing (western) lagoon was estimated during the VSI at 3 feet, and estimated at being anywhere from 7 to 14 feet in the roughing (eastern) lagoon. The impoundments were used to collect sludge from the settling of lime-treated wastewater flocculants and for retention of the liquid effluent prior to discharge via the NPDES permit. See Appendix C, Photographs 6 and 7 for surface impoundments.

B. Period of Operation: 1970 - 1988

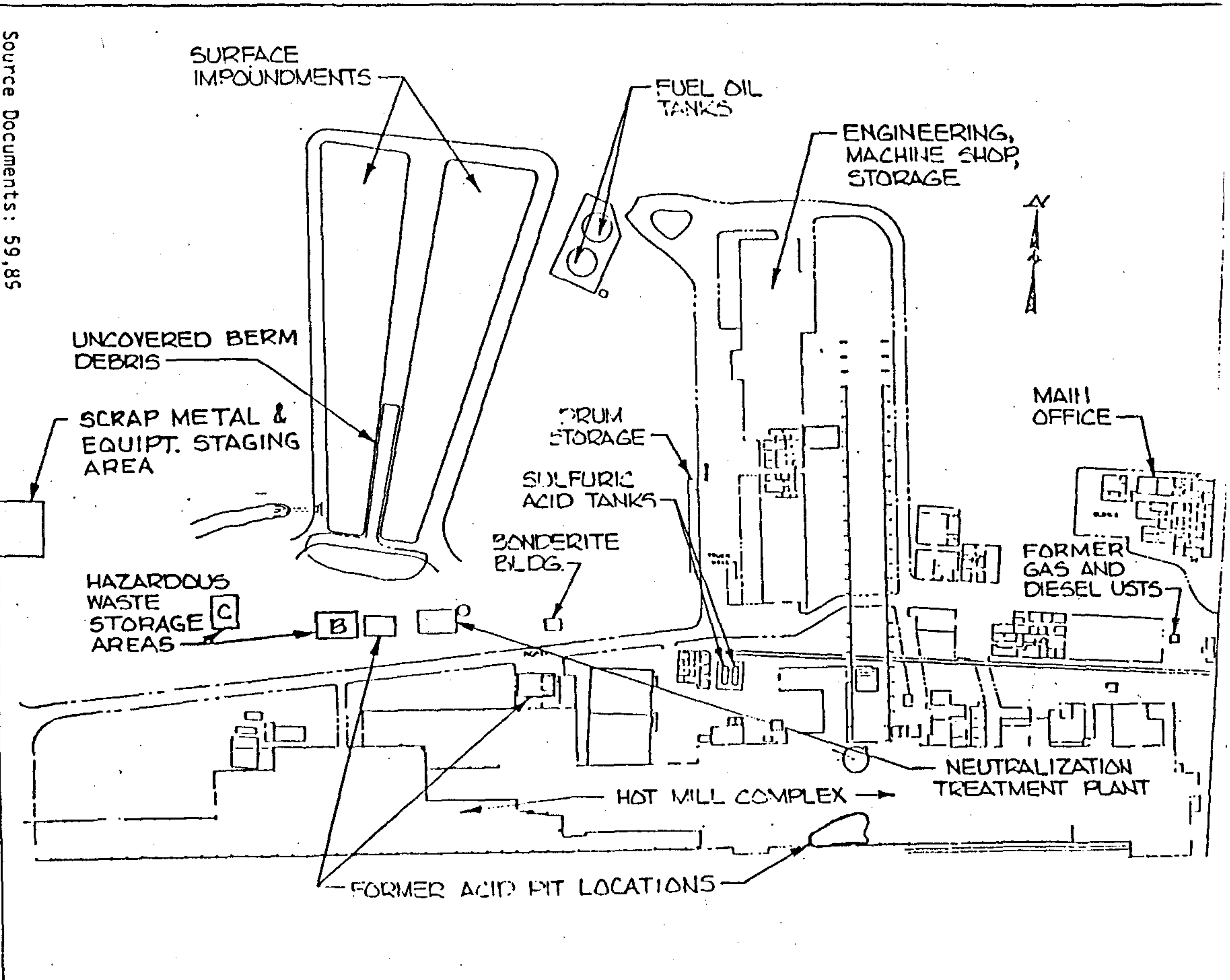

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FIGURE 6: Locations of SWMUs, Areas of Concern And Process Areas

SCALE: NONE

C. Waste Type: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation. According to a July, 1989 Type III Designation Petition by Quanex Corp. - MST for the surface impoundment sludge, LSWPLS was included in U.S. EPA's first list of hazardous wastes. It was also reported that in 1980, K063 materials were deleted from the list, but U. S. EPA continued regulation under the "derived from" rule, 40 CFR 261.3(c)(2). The petition concluded by stating that K063 materials were fully exempted from the presumption of hazardousness effective December 5, 1984, based upon leachate testing and site specific delisting petitions (8).

Waste Volume/Capacity: 46,900 Cubic Yards (CY) after stabilization with flyash (estimated).

Waste Constituents: LSWPLS contains constituents which would make it a hazardous material if present above acceptable concentrations. According to a July, 1989 Type III Designation Petition for the surface impoundment sludge, hexavalent chromium and lead are present in immobile forms with leachate test values well below maximum permissible E.P. TOX limits (8, Appendix B). Other possible waste constituents, including cadmium, copper, nickel, silver and zinc, are detectable in E.P. Toxicity leachate, but are also below the lower limit for classification as E.P. Toxic. Classification in terms of TCLP testing is unknown.

D. Release Controls: Impoundments have release gates for liquids, but do not have clay liners. Sludge has been stabilized with flyash.

E. Release History: No releases have been reported. Clarified free liquid has been discharged per NPDES permit. Normal operations occurred where sludge was removed by dredging from 1971 to 1975, and by pumping from 1975 to 1987, and placed in sludge drying beds on-site. Potential for releases to groundwater exists and is monitored (See Appendix E).

F. Observations: Impoundments do not have clay liners.

G. Sample Results: VOC testing for scans 601 and 602 found toluene at 0.09 and 0.14 mg/kg in two of three sludge samples taken. See Appendix A. Cadmium, copper, lead, nickel, silver and zinc are detectable in E. P. Toxicity leachate at less than hazardous levels. See Appendix B. Also, groundwater test data from adjacent monitoring wells is presented in Appendix E.

4.2 Unit Type: Sludge Drying Beds

Regulatory status: SWMU. This area is inactive. The sludge was delisted from the proposed K063 hazardous waste designation by the U.S. EPA in 1984 as described in Section 4.1C (8). Quanex Corp. - MST attempted to prove in 1987 that the sludge in the drying beds is an inert waste, but levels of manganese and lead were found to exceed the drinking water standards (44). Nonetheless, Quanex Corp MST submitted a Type III Designation Petition on January 29, 1988 for site-specific MDNR consideration prior to conducting disposal activities (11, 33). See Figure 3 for location of drying beds.

A. Unit Description: This area was used to dewater sludge transferred from two surface impoundments. The northern bed is approximately 500 feet long (east to west) by 160 feet wide (north to south) with a sludge depth of about 9-14 feet. The southern bed is approximately 325 feet long (east to west) and 225 feet long (north to south) with a sludge depth of about 7-10 feet (50). See Appendix C Photographs 25 and 26 for sludge drying beds.

B. Period of Operation: 1970 - 1987

C. Waste Type: The lime stabilized waste pickle liquor sludge (LSWPLS) was classified under the proposed K063 waste designation. According to a January, 1988 Type III Designation Petition by Quanex Corp. - MST for the drying beds, an industry-wide delisting of K063 materials by the U.S. EPA occurred June 5, 1984, to be effective December 5, 1984. According to the petition, the delisting came about due to data presented by the American Iron and Steel Institute (AISI) and site-specific delisting petitions (53).
Waste Volume/Capacity: Approximately 80,000 CY
Waste Constituents: LSWPLS contains constituents which would make it a hazardous material if present above acceptable concentrations. According to a January, 1988 Type III Designation Petition for the drying bed sludge, hexavalent chromium and lead are present in immobile forms with leachate test values well below maximum permissible E.P. TOX limits (33, Appendix B). Other possible waste constituents, including barium, cadmium, copper, manganese, nickel, silver and zinc, are detectable in E.P. Toxicity leachate but are also below the lower limit for classification as E.P. Toxic hazardous. Classification in terms of TCLP testing is unknown.

D. Release Controls: Groundwater monitoring wells are located to the south and west. Sludge has not been stabilized with flyash.

E. Release History: None known. Groundwater monitoring results show presence of contaminants attributed as background (See Appendix E).

F. Observations: Beds have berms but not clay liners.

G. Sample Results: Barium, cadmium, copper, lead, manganese, nickel, silver and zinc are detectable in E.P. Toxicity leachate at less than hazardous levels. See Appendix B. Also, groundwater test results from adjacent monitoring wells are provided in Appendix E.

4.3 Unit Type: Former Acid Pits

Regulatory status: SWMU. These areas are inactive and underwent closure prior to existence of formal closure regulations. In an April 1986 Loss of Interim Status Inspection Report - Checklist, prepared by a consultant to the U.S. EPA, these areas were given a status described as having completed closure in a manner acceptable to the responsible agency and in accordance with the closure plan. Closure of the units at that time was reported to the MDNR and U.S. EPA (59). As shown in Figure 6, these pits have been covered over during plant expansion activities.

A. Unit Description: The three pits were approximately 80 feet by 80 feet by 6 feet deep and contained waste pickle liquor sludge which may have been treated by lime (64).

B. Period of Operation: Approximately 1935 to 1969

C. Waste Type: Lime stabilized waste pickle liquor sludge (LSWPLS).
Waste Capacity/Volume: Approximately 1400 CY.
Waste Constituents: LSWPLS sample test data not available. More-recently produced LSWPLS in the drying beds and impoundments contain a variety of metals, see sections 4.1C and 4.2C of this report.

D. Release Controls: Groundwater monitoring has been performed and contaminants detected in levels considered by the facility to be background. See Part G below and Appendix E.

E. Release History: None known.

F. Observations: Detecting the lack or presence of hazardous levels of LSWPLS constituents in the former pit areas might be a good indication of potential for long-term releases from the impoundment and drying bed sludges, since the use and closure of the pits occurred years ago (1935-1969).

G. Sample Results: Data from monitoring wells 3, 14A and 14B near two of the former pit locations, as reported in a 1986 Groundwater Quality Assessment Program (GQAP), has indicated little variability between parameters measured for suitability as a drinking water supply and in terms of VOC's and totals for metals found in upgradient well 1 (60, Figure 5, Appendix E). Parameters detected during assessment monitoring include sodium, barium, chromium, fluoride, chloride, manganese, and phenols in reportedly acceptable levels per 40 CFR 265 Appendix III; iron, arsenic and sulfate in slightly higher concentrations, and methylene chloride in very high concentrations (32, 60). All of these items of concern have been explained in the Quanex GQAP report as: background levels, due to unfiltered samples, typical in near surface groundwater or due to error in analytical technique (47,60). Other chemical analyses and suitability testing per drinking water standards are given in the GQAP report and show no large discrepancy from the other data (See Appendix E). From a regulatory approval aspect, the U.S. EPA approved the April, 1986 GQAP, based on inclusion of inserts from July, 1986 and replacing of a single page per direction of William Muno, EPA, in September, 1986 (47). The files did not contain this additional information.

4.4 Unit Type: Uncovered Berm Debris

Regulatory status: SWMU. Scrap metal and drum remnant debris was discovered during sludge solidification for closure of the two surface impoundments. Removal and disposal of the material is awaiting a response to either a March 24, 1989 work plan submitted to MDNR, or an amended closure plan for the surface impoundments submitted in August 1989 to MDNR (4, 9).

A. Unit Description: The debris is located in the berm and southern end of the two surface impoundments (See Figure 6). Origin is unknown and presumed to be historic dumping from a staging area for scrap metal. See Appendix C, Photographs 9 and 10 for berm debris.

B. Period of Operation: Unknown

C. Waste Type: Solid wastes including steel scrap and drum remnants.
Waste Volume/Capacity: Unknown, preliminary debris area is 180 feet long and berm is approximately 20 feet wide (14).
Waste Constituents: Toluene; 1,1,1 trichloroethane; chromium, and lead have been detected in berm soil samples tested for VOC's and trace and total metals (9).

D. Release Controls: Groundwater monitoring wells are located nearby (See Figure 5 and Appendix A).

E. Release History: Unknown. Due to nearby location of the scrap metal and retired equipment dismantling area, it is speculated that some of this material was used during construction of the berms for the surface impoundments.

F. Observations: Scrap metal debris was observed on the berm surface.

G. Sample Results: Discovery of the debris lead to taking of eight berm soil samples, three stabilized impoundment-sludge samples, and one groundwater sample on December 20, 1988. All samples were tested for volatile organic scans 601 and 602 and for trace and total metals (9). Toluene, 1,1,1 -trichloroethane, chromium and lead were found in the soil and dried sludge samples. Contaminant levels did not exceed E.P. Toxicity allowable levels (9). See Appendix A. Groundwater testing found no contaminants.

4.5 Unit Type: Hazardous Waste Storage Facility B

Regulatory status: SWMU. This facility stored barium and corrosive materials on a concrete pad (43). The facility has been removed and clean closed. Closure certification was accepted when MDNR released Quanex Corp-MST from financial responsibilities regarding the closed unit (1, 117).

A. Unit Description: Area B was a fenced-in drum storage pad, 40 feet by 40 feet. See Figure 7 and Appendix C, Photograph 11 for the former location of the pad.

B. Period of Operation: 1984-1989.

C. Waste Type: Hazardous spent materials.
Waste Volume/Capacity: Approximately 110 gallons of barium and 2 CY of corrosive materials.
Waste Constituents: Waste barium (D005) and corrosive solids (D002).

D. Release Controls: The Area B pad has been removed and clean closed per MDNR release of Quanex Corp - MST from financial responsibilities regarding the closed unit.

E. Release History: None reported.

F. Observations: Area B is currently a clean gravel lot next to a fenced empty drum storage area.

G. Sample Results: No sampling results were found in the files. Revision 1 of the closure plan, dated August 5, 1987, indicated that soil below the pad would be removed if barium above background levels was found (43). A November, 1989 MDNR letter reviewing Quanex Corp.-MST's October, 1989 closure certification did comment on completed testing for background levels of barium (1). It was reported by Quanex Corp. - MST during the VSI that no evidence of releases was found.

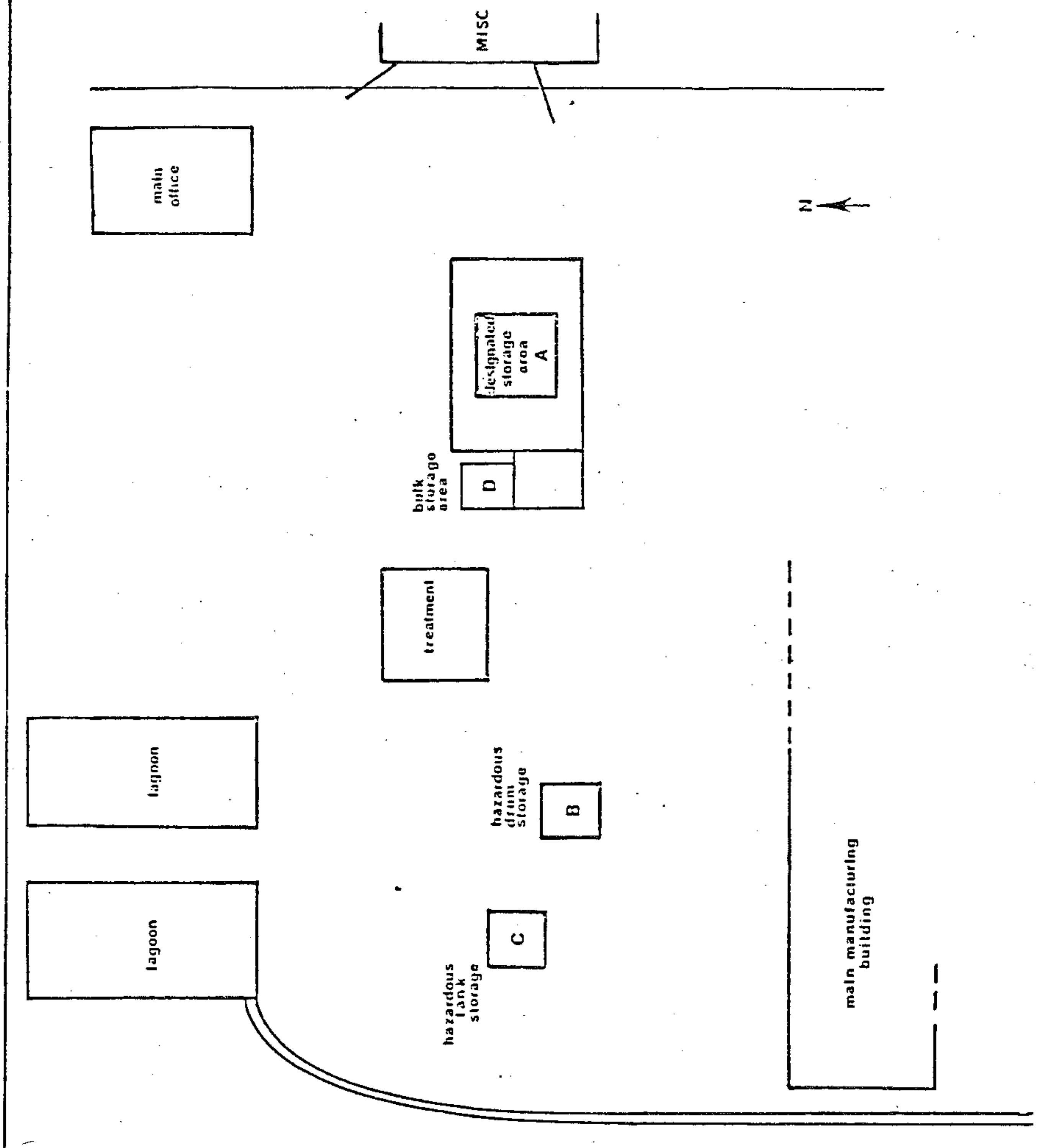

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FIGURE 7: General Layout Of Hazardous Materials Storage Areas B&C

SCALE NONE

4.6 Unit Type: Hazardous Waste Storage Facility C and Sump

Regulatory status: SWMU. Area C is active and is used for the temporary storage of waste oil and drum solvents for less than 90 days (64,80).

A. Unit Description: Area C is a spent-oil and solvent drum/tank storage pad including a 10,000 gallon aboveground tank for waste oils and an area for spent-solvent drums. This area also has a surface water runoff collection system and sump. See Figure 7 and Appendix C, Photographs 13 and 14 for Area C location and details.

B. Period of Operation: 1979 - Present

C. Waste Type: Waste oil and spent solvents.
Waste Volume/Capacity: 10,000 gallons of waste oil and approximately 35 drums.
Waste Constituents: Spent petroleum products and solvents.

D. Release Controls: Area C is diked for 150% containment and has a sump for runoff and spill collection.

E. Release History: None reported.

F. Observations: Approximately 35 drums were in Area C during the VSI. The amount, level, etc. of waste in the drums and the 10,000 gallon tank is uncertain. Area C has a total capacity of more than 35 drums, but a total capacity figure has not been documented.

G. Sample Results: Sampling and testing have not been performed for Area C.

4.7 Unit Type: Fuel Oil Release Area

Regulatory status: SWMU. Inactive area of previous fuel oil spillage. Discovery of fuel oil in Yerkes Drain in 1974 was traced to a ruptured line beneath the Quanex mill building. The ruptured line was disconnected from the supply source but not removed from below the mill. Spillage was a one time occurrence. Release controls and collection equipment approved by the MDNR and MWRC have been installed between the point of release and Yerkes Drain (75). Recovery of about 290,000 gallons of fuel oil has occurred and currently, about 10 gallons is collected every six months.

A. Unit Description: Area from point of release beneath main mill building to Yerkes Drain (See Figure 4). See Appendix C, Photographs 22-24 and 27 for photo details.

B. Period of Operation: 1973-74 to present

C. Waste Type: Fuel oil.
Waste Volume/Capacity: Approximately 200,000 - 500,000 gallons (reported as 280,000 gallons during VSI).
Waste Constituents: Fuel-related hydrocarbons

D. Release Controls: Monitoring wells, pea-gravel trench interceptor, groundwater baffle, caissons and float oil skimmers.

E. Release History: Release occurred in late 1973 or early 1974 and was discovered on March 9, 1974.

F. Observations: Oily film was not observed on the water in Yerkes Drain.

G. Sample Results: File information on soil and water sampling reported the fuel oil to be a high grade #1, #2, or #3 fuel oil but levels of fuel oil were not provided (57). File information also documents that extensive test pit excavation occurred and monitoring wells were installed to define the area of extent of the release, but sample testing results were unavailable (83).

4.8 Unit Type: Former Landfill/Wastepile

Regulatory status: <u>SWMU</u>. This area is currently active for temporary storage of scrap materials prior to disposal. Due to the nature of the materials contained in the area: steel scrap, old equipment, etc., neither Quanex Corp - MST or PRC Engineering, a consultant to U.S. EPA which drafted a 1986 LOIS Certification, regarded the area as containing hazardous wastes (59, 64).

A. Unit Description: Abandoned landfill was 200 feet by 200 feet by 3 feet deep. Miscellaneous scrap was placed in the landfill for eight years. Wastepile was 50 feet by 3 feet by 3 feet high and temporarily stored non-hazardous scrap material for eight years. Current activity includes the temporary staging of old equipment prior to scrapping activities. See Figure 6 for location of the area and Photographs 15, 16 and 17 in Appendix C for details.

B. Period of Operation: Landfill 1967 (?) to 1977; Wastepile - 1977 to 1985 (Present).

C. Waste Type: Non-Hazardous solid wastes.
Waste Volume/Capacity: Landfill 4400 CY, Wastepile 50 CY.
Waste Constituents: Waste constituents include trash, bricks, scrap steel, broken concrete, steel scale and sand.

D. Release Controls: None.

E. Release History: None reported.

F. Observations: Scrap/equipment tended to be large in size and scattered throughout the area (not a pile as the name implies). Exact location of Monitoring Wells 16A & B with respect to area is uncertain.

G. Sample Results: Results of groundwater monitoring of nearby wells 16A & B have shown an indication of copper (30 μg/L) and arsenic (2.3 μg/L). Copper and arsenic have also been found in other wells at low levels and Quanex Corp. - MST describes them as background contaminants. The monitoring results also report levels of other elements considered to be background in nature, due to consistent findings at elevated levels in upgradient and downgradient wells (32, 60). See Appendix E.

4.9 Unit Type: Filter Presses

Regulatory status: SWMU. The presses are active treatment units.

A. Unit Description: Clarifier sludge is dewatered in filter presses prior to offsite disposal to a Type II (non-hazardous) landfill. See Figure 6 for location and Appendix C, Photograph No. 8, for additional information.

B. Period of Operation: 1988 - present

C. Waste Type: Lime stabilized waste pickle liquor sludge (LSWPLS).
Waste Volume/Capacity: Not determined.
Waste Constituents: Those constituents common to LSWPLS not stabilized with flyash. See Section 4.2 Part C for details.

D. Release Controls: Not determined.

E. Release History: None reported.

F. Observations: Equipment present and operational.

G. Sample Results: LSWPLS same as prior to use of filter press, see Section 4.2 Part G.

4.10 Unit Type: Neutralization Plant

Regulatory status: SWMU. This is active as a part of the treatment process. Waste pickle liquor is a hazardous waste (K062) before being treated due to its low pH (may not be the only criteria). Quanex Corp. - MST claims exemption of this waste from Part 264 and 270 requirements, because the sewers and tanks in their "totally enclosed" treatment system meet the requirements of Part 261.4(c) and Parts 270.1(c)(2) iv and v(75).

A. Unit Description: This facility treats waste pickle liquor from the manufacturing process by using lime to neutralize sulfuric acid and cause sludge to settle out of solution. Lime stabilized waste pickle liquor is discharged to clarifiers which collect sludge and discharge liquid to Yerkes Drain per NPDES permit. The facility is located as shown on Figure 6. See Appendix C, Photograph 5, for details.

B. Period of Operation: ? (1969) - Present.

C. Waste Type: Waste pickle liquor stabilized by lime.
K062 waste designation.
Waste Volume/Capacity: Not determined.
Waste Constituents: Water acid & chemicals, sulfuric acid pickle, acid rinse water, zinc phosphate, sodium stearate, cleaner and lime.

D. Release Controls: Waste pickle liquor is delivered by enclosed sewer system, treated in a contained area, and discharged to clarifiers.

E. Release History: None reported.

F. Observations: Construction neutralization treatment plant covered over monitoring wells 3, 14A and 14B.

G. Sample Results: None found in file information. U.S. EPA rejected a proposed delisting by Quanex Corp. - MST for the K062 effluent on August 24, 1988, due to groundwater concerns for the then-operating surface impoundments (20, Appendix E).

5.0 SUMMARY AND RECOMMENDATIONS

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The principal environmental concerns at the Quanex Corp - MST facility involve unresolved determinations of status for the surface impoundments, sludge drying beds, and uncovered berm debris. The VSI provided information which verified the file information and revealed additional information necessary for a complete update and status check of all areas considered. A summary of, and recommendations for, each SWMU, including possible sampling or further analysis required, is provided as follows:

1. No further sludge testing will be necessary if MDNR accepts a Type III designation for the sludge and agrees to closure in-place of the material. If MDNR does not accept that designation, then sampling and testing during sludge removal to a Type II landfill will be required.

2. Sludge Drying Beds: MDNR acceptance of the Type III designation for the sludge will relieve the need for additional sampling. Denial of the Type III designation by MDNR should result in the performance of sampling during the sludge removal and disposal.

3. Former Acid Pits: The locations of the former acid pits are uncertain, closures (of unknown degree) have been reported, the pits' contents appear to have been non-hazardous LSWPLS and groundwater monitoring has revealed no obvious concerns. However, since little information about the pits is available, and testing at these potential sources might reflect the long-term effects of the drying bed and impoundment sludges, sampling is recommended.

4. Landfill/Wastepile: This area is active for temporary storage of non-hazardous scrap materials. Groundwater monitoring wells are located nearby. Continued periodic groundwater monitoring is recommended.

5. Uncovered Berm Debris: MDNR determination regarding the proposed work plan for the debris removal and disposal should be completed. Soil sampling during removal of the debris in accordance with MDNR determinations and actions should be performed.

6. Hazardous Waste Storage Facility B: No action appears to be necessary.

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7. Hazardous Waste Storage Facility C: Area C is active and no releases have been reported. However, sampling and testing is recommended based on information that the diking and sump may have not been constructed prior to use of the facility.

8. Fuel Oil Release Area: No action appears to be necessary. Continue to monitor reports of fuel oil recovery from collection system.

9. Filter Press: This equipment is active and no releases have been reported. Disposal of LSWPLS is to a licensed Type II landfill. No further action appears to be required.

10. Neutralization Plant: It is active in the treatment process and no releases have been reported. Waste pickle liquor is contained and treated. Stabilized sludge settles out in clarifers and liquid is discharged per NPDES permit. No further action appears to be required.

See Table 2 on the following pages for a summary of SWMU information.

TABLE 2

QUANEX CORP - MST
SOUTH LYON, MICHIGAN
SOLID WASTE MANAGEMENT UNITS SUMMARY

Solid Waste Management Unit	Operational Dates	Release History	Suggested Further Action
Surface Impoundments	1970 - 1988	None reported. Free liquid was discharged to Yerkes Drain per NPDES permit and sludge was put in sludge drying beds. Remaining sludge has been designated as Type II waste thus far.	MDNR determination on Type III designation and amended plan for closure in-place of sludge. Possible subsequent sampling and and testing.
Sludge Drying Beds	1970 - 1987	None known.	MDNR determination on Type III designation petition. Possible subsequent sampling and testing.
Former Acid Pits	1935 - 1969	None known.	Soil boring and sampling.
Landfill/Wastepile	1967(?)-77 /1977-1985 (Present)	None known.	Continue periodic groundwater monitoring.
Uncovered Berm Debris	Unknown	Unknown. May have occurred during surface impoundment construction.	MDNR approval/disapproval of proposed work plan. Soil sampling during excavation and disposal.
Hazardous Waste Storage Facility B	1984-1989	None known.	None.
Hazardous Waste Storage Facility C and Sump	1979 -Present	None known.	Sampling to confirm no releases prior to construction of containment.

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TABLE 2 (CONTINUED)

QUANEX CORP - MST
SOUTH LYON, MICHIGAN
SOLID WASTE MANAGEMENT UNITS SUMMARY

Solid Waste Management Unit	Operational Dates	Release History	Suggested Further Action
Fuel Oil Release Area	1974-Present	Release occurred during late 1973 or early 1974.	None.
Filter Press	1988-Present	None known.	None.
Neutralization Plant	?(1988)-Present	None known.	None.

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6.0 CONCLUSIONS

The PR/VSI identified 10 SWMU's at the Quanex Corp-MST facility. Background information on the facility's location, operations, waste generating processes, environmental setting, release potentials and receptors is presented in Sections 2.0 and 3.0. SWMU specific information such as the unit's description, dates of operation, wastes managed, release controls, release history, observed conditions, and sample results is discussed in Section 4.0.

SWMU 1-Surface Impoundments

There is a potential for a future release to groundwater since the impoundments do not have clay liners and the sludge is still present. Low levels of contaminants have been detected in samples of solidified sludge, and in monitoring wells.

There is a low potential for a future release to surface water. The impoundments are currently inactive and undergoing closure.

There is a low potential for a release to air since the impoundments are inactive, solidified, and undergoing closure. However, sludge samples have indicated low levels of volatile organic compounds.

The potential for a future release to soil exists because the impoundments do not have clay liners and the sludge is still present. Low levels of contaminants have been detected in samples of solidified sludge.

There is a low potential for a release of subsurface gas because the impoundments are inactive and the sludge is solidified. However, samples of the sludge have indicated low levels of volatile organic compounds.

SWMU 2-Sludge Drying Beds

There is a potential for release to groundwater since the sludge has not been stabilized with flyash and the beds are not clay lined. Sampling of the sludge leachate has indicated low levels of contaminants. Monitoring wells are present in this area and test results of the groundwater show the presence of contaminants attributed as background.

There is a low potential for a future release to surface water. The area is inactive and is surrounded by berms.

There is a low potential for a release to air since the waste is not characterized by volatile organic compounds.

There is a potential for a release to soil because the sludge has not been stabilized and the beds are not clay lined. Lead and manganese may have entered the soil surrounding the beds(44).

There is a low potential for a release of subsurface gas since the waste is not characterized by volatile organic compounds.

SWMU 3-Former Acid Pits

There is a low potential of a future release to groundwater since the pits were closed in 1969 and the area has been built over. Contaminants detected in groundwater are at levels considered to be background by the facility.

There is a low potential of a future release to surface water since the pits were closed in 1969 and the area has been built over.

There is a low potential for a release to air since the area has been built over. The volatile organic compound detected in groundwater samples which has been explained by the facility would have to migrate through the soil to the surface.

The potential for a release to soil is uncertain since the area has been built over during plant expansions and closure/cleanup is not documented.

There is a low potential for a release of subsurface gas. The area has been built over and any organic compounds, if present, would have to migrate through the soil to the surface.

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SWMU 4-Uncovered Berm Debris

There is a potential for a release to groundwater. Volatile organic compounds and heavy metals have been detected in soil samples. Groundwater testing has found no contaminants.

There is a low potential of a release to surface water. There is no documentation concerning a release to surface water.

The air could be a receptor if the volatile organic compounds detected in the soil volatilize and migrate to the surface.

There is a potential for a release to soil of contaminants detected in the soil samples, since the debris is still present.

There is a potential for a release of subsurface gas since volatile organic compounds have been detected in soil samples.

SWMU 5-Hazardous Waste Storage Facility B

There is no potential for a release to groundwater since the facility has been removed and clean closed.

There is no potential for a release to surface water since the facility has been removed.

There is no potential for a release to air since the facility has been removed.

There is no potential for a release to soil since the facility has been removed and clean closed.

There is no potential for a release of subsurface gas since the facility has been removed and clean closed.

SWMU 6-Hazardous Waste Storage Facility C and Sump

There is a low potential for a release to groundwater since the area is diked and has a sump for runoff and spill collection.

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There is a low potential for a release to surface water since the area is diked and has a sump for runoff and spill collection.

There is a potential for a release to air if the drums of spent solvents are opened.

There is a low potential for a release to soil since the area is diked and has a sump for runoff and spill collection.

There is a low potential for a release of subsurface gas since the area is diked and has a sump for runoff and spill collection.

SWMU 7-Fuel Oil Release Area

There is a low potential for a future release to groundwater since the ruptured line was disconnected and release controls and collection equipment are in place.

The release of fuel oil to surface water has been documented. A ruptured fuel line was the cause for the release. The line was disconnected and release controls and collection equipment have been installed. Recovery of the fuel oil is still occurring at a rate of 10 gallons every six months. The potential for a future release to surface water is low because of the passive collection and control measures present.

The air could be a receptor if gases migrate through the soil to the surface.

The potential for a release to soil is present since the buried fuel line was disconnected from the supply but not removed. However, any releases would be contained by primary and secondary control measures.

There is a potential for a release of subsurface gas if the material can migrate through the soil to the surface.

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SWMU 8-Former Landfill/Wastepile

There is a low potential for a release to groundwater since the waste constituents are non-hazardous.

There is a low potential for a release to surface water because the area was used for temporary storage of non-hazardous scrap material.

The potential for a release to air is low because the waste is not characterized by volatile organic compounds.

There is a low potential for a release to soil since the wastes are solid and considered non-hazardous.

There is a low potential for a release of subsurface gas since the waste is not characterized by volatile organic compounds.

SWMU 9-Filter Presses

There is no potential for a release to groundwater. This machine dewaters the lime stabilized waste pickle liquor sludge prior to offsite disposal. The water is discharged per NPDES permit through an outfall.

There is a low potential for a release to surface water. Water from the sludge is discharged through a NPDES permitted outfall.

There is a low potential for a release to air since the sludge waste is not characterized by volatile organic compounds.

The potential for a release to soil is low since the press dewaters the sludge, with the sludge going for offsite disposal and the water going to an outfall.

There is a low potential for a release of subsurface gas since the sludge waste is not in contact with the ground at this SWMU and the waste is not characterized by volatile organic compounds.

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SWMU 10-Neutralization Plant

There is a low potential for a release to groundwater because it is an enclosed treatment system. However, low levels of contaminants have been detected in nearby monitoring wells.

There is a low potential for a release to surface water is something fails in the treatment process and water is discharged to surface water with contaminants above permitted levels.

There is a low potential for a release to air since this is an enclosed treatment system.

The potential for a release to soil is low since this unit is an enclosed treatment system. There is no documentation concerning any releases.

There is a low potential for a release of subsurface gas because the treatment system is enclosed.

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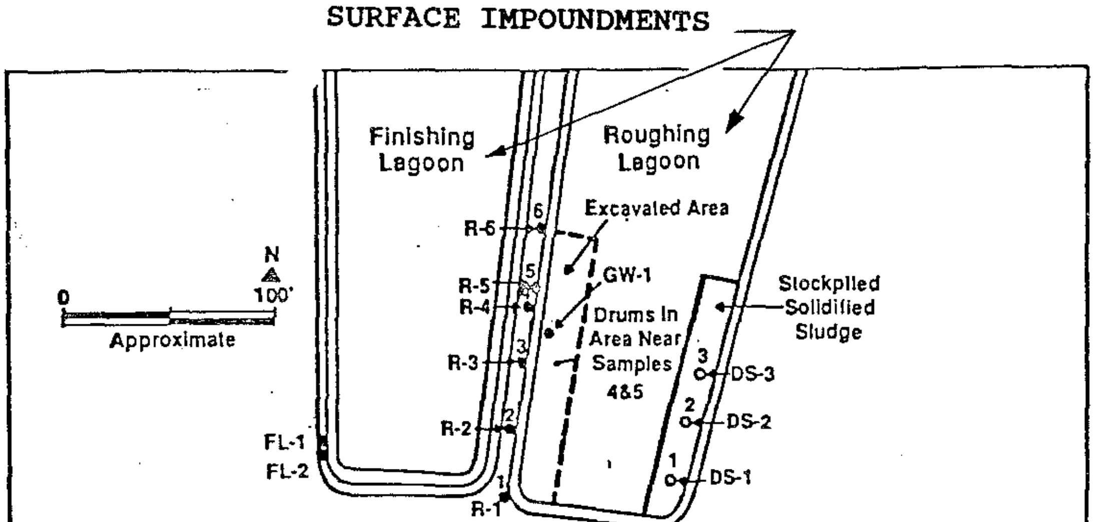
APPENDIX A

UNCOVERED BERM DEBRIS
SAMPLING TEST RESULTS
(REF. 9)



R-1	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.39

R-2	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.14

R-3	Roughing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.50

R-4	Roughing Lagoon
Toluene	0.059
1,1,1 - Trichloroethane	0.083
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

R-5	Roughing Lagoon
Toluene	0.043
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	0.07
Lead (E.P. Tox)	0.10

R-6	Roughing Lagoon
Toluene	0.039
1,1,1 - Trichloroethane	0.12
Chromium (E.P. Tox)	0.08
Lead (E.P. Tox)	3.6

GW-1	Groundwater
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (Totals)	*
Lead (Totals)	*

FL-1	Finishing Lagoon
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

FL-2	Finishing Lagoon
Toluene	0.08
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-1	Dried Sludge
Toluene	0.09
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-2	Dried Sludge
Toluene	0.14
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-3	Dried Sludge
Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

Metals Results in mg/l
Volatile Results in mg/kg
* Non-Detect

Figure 1

Berm Sampling Locations and Analytical Results
Quanex Corporation

January, 1989 21086

EDI Engineering & Science

SOURCE: 9

SOURCE: REFERENCE NO. 9

5555 Glenwood Hills Parkway, SE • Grand Rapids Michigan 49508 • (616) 942-9600

RECEIVED
MAR 27 1989
WASTE MANAGEMENT DIV.

EDI Engineering & Science
Environmental Engineering, Geology Biology and Chemistry

March 24, 1989

Ms. Ronda Hall, Engineer
Waste Management Division
Michigan Department of Natural Resources
Ottawa Street Building - South Tower
P O Box 30028
Lansing, MI 48909

RE: QUANEX IMPOUNDMENT BERM EXCAVATION

Dear Ronda:

The proposed work plan for the impoundment berm excavation is enclosed for your review. As you requested at our March 10, 1989 meeting, we have also mailed five hard copies to you and one copy directly to Lynne King at the Northville District Office. We look forward to receiving your comments the first week of April.

Please call me at (616) 942-9600 if you have any questions.

Sincerely,

EDI ENGINEERING & SCIENCE

K. Lynnes

Kathryn D. Lynnes
Project Manager
Environmental Compliance

KDL/mck

Enclosures

WORK PLAN TO REMOVE DEBRIS FROM THE BERMS SURROUNDING THE SOUTH SIDE OF THE SURFACE IMPOUNDMENTS AT THE QUANEX FACILITY IN SOUTH LYON, MICHIGAN

BACKGROUND

Michigan Seamless Tube Division of Quanex Corporation is closing two surface impoundments that contain a lime neutralized spent pickle liquor sludge from its steel finishing operation. During the sludge solidification process at the southwest end of the roughing lagoon, an area of debris was discovered in the berm separating the roughing lagoon and the finishing lagoon. The debris consisted predominantly of steel scrap but also included drum remnants. The majority of the debris was located in the dividing berm approximately 180 feet north from the south end of the lagoons. The debris area also appears to extend into the berm at the south side of the surface impoundments.

WASTE CHARACTERIZATION

On December 20, 1988, a total of eleven samples were taken from the area being studied: six soil samples were taken from the debris area within the berm, three samples from the stockpiled solidified sludge, and two soil samples from the western berm of the finishing lagoon. A water sample was also taken of the water which had entered the excavation adjacent to the debris area. The eleven solid samples and one water sample were analyzed for volatile organic scans 601 and 602. The soil samples were also analyzed for ten trace metals. Sampling locations and detectable analytical results are provided in Figure 1. The complete listing of analytical results is provided in Attachment I.

Only six of the total twelve samples were found to contain volatile organic constituents. These six samples contained low levels of toluene. Two of the six samples also contained low levels of 1,1,1-trichloroethane (TCA). One of the six samples, sample R-4 (see Figure 1), was taken of the white paint sludge-like material that was observed near one of the rusted drum remnants. The toluene and TCA may be related to the sludge which appears to have originated from the drums. Because the rusted drums account for only a small portion of the debris, the extent of any organic contamination is expected to be limited. The one ground water sample did not have detectable levels of any volatile organic constituents.

All twelve samples were analyzed for total metals. Only chromium and lead were detected in excess of 20 times the EP toxicity levels; consequently, EP toxicity analyses were performed on all soil samples for chromium and lead. The results of the EP toxicity analyses demonstrated that none of the soil samples are E.P. toxic as defined in 40 CFR 261.24. The results of the EP toxicity analyses are listed on Figure 1 and actual analytical lab data sheets are appended in Attachment I.

Because the origin of the debris cannot be clearly identified, soil or sludge removed from the debris area in the impoundment berms can be defined as non-hazardous Type II waste. The MDNR has agreed to Type II characterizations under similar circumstances in the past. The drum remnants from the berm area will be disposed of as Type II wastes. The landfill currently being considered for the Type II disposal is Arbor Hills landfill operated by BFI corporation.

REMEDIATION STRATEGY AND SCOPE OF WORK

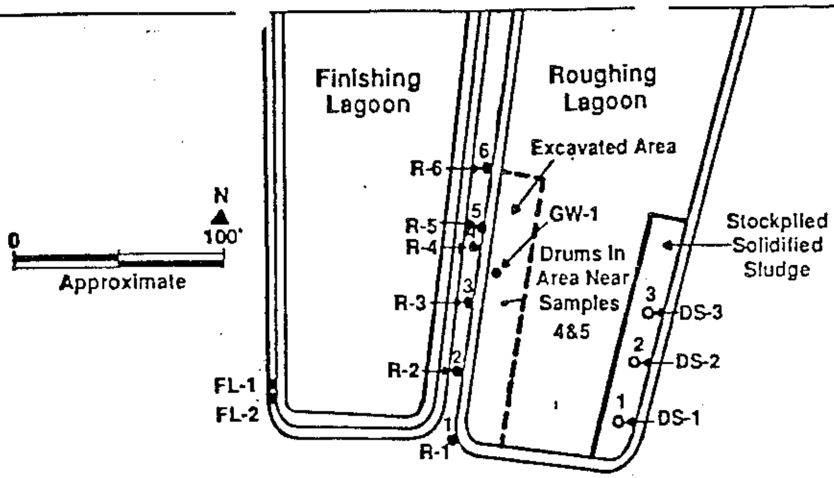
The objective of the work plan is to remove drum remnants, visibly impacted soils, and associated metal debris from the berm area surrounding the south side of the surface impoundments. The extent of soil removal is dependent on the extent of the drum remnants within the south berm area. The soil removal will extend beyond sample R-6 (Figure 1) where previous sampling was performed. The estimated extent of the remediation is shown in Figure 2. The fill material that composes this area includes the dividing berm that is positioned between the roughing and finishing lagoons.

Any buried drum remnants encountered will be removed along with visibly contaminated surrounding soils. The drums will be segregated, isolated and stockpiled on a staging pad located immediately adjacent to the excavation. A drum excavation and field sampling procedure protocol will be followed for any drums found within the fill area specified. The procedure for documenting and sampling the buried drum area is outlined in Attachment II. The contents of the exposed drum(s) will be analyzed to determine if the waste is hazardous by characteristic. These analyses will include total metals and EP toxicity. Associated metal debris from the berm area such as piping, steel cables and drums will be removed and disposed of or sent to a reclamation facility.

If residual contents associated with any of the drum remnants are observed, the soils underlying the residual contents of the drums will be scanned with a vapor photoionization detection (PID) meter. Any underlying soils which cause the PID meter to read over 5 ppm will also be excavated.

Written and photo documentation will be conducted in all stages of the remediation project.

A report documenting these activities will be submitted to the MDNR at the conclusion of the excavation. The report will include a summary of field activities, waste shipping records, analytical results, chain-of-custody records, and QA/QC procedures.



R-1 Roughing Lagoon

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.39

R-2 Roughing Lagoon

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.14

R-3 Roughing Lagoon

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	0.50

R-4 Roughing Lagoon

Toluene	0.059
1,1,1 - Trichloroethane	0.083
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

R-5 Roughing Lagoon

Toluene	0.043
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	0.07
Lead (E.P. Tox)	0.10

R-6 Roughing Lagoon

Toluene	0.039
1,1,1 - Trichloroethane	0.12
Chromium (E.P. Tox)	0.08
Lead (E.P. Tox)	3.6

GW-1 Groundwater

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (Totals)	*
Lead (Totals)	*

FL-1 Finishing Lagoon

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

FL-2 Finishing Lagoon

Toluene	0.08
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-1 Dried Sludge

Toluene	0.09
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-2 Dried Sludge

Toluene	0.14
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

DS-3 Dried Sludge

Toluene	*
1,1,1 - Trichloroethane	*
Chromium (E.P. Tox)	*
Lead (E.P. Tox)	*

Metals Results in mg/l
Volatile Results in mg/kg
* Non-Detect

Figure 1

Berm Sampling Locations and Analytical Results
Quanex Corporation

January, 1989 21086

EDI Engineering & Science

APPENDIX B

SLUDGE BEDS AND IMPOUNDMENTS:

CONSTITUENT LEVELS
(REF. 44, 50)

SLUDGE DRYING BED: SLUDGE SAMPLE CONSTITUENTS

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.0.5	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	<0.05	<0.08	<0.05	<0.06	0.21	0.11	<0.05	0.15	0.47	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	0.01	<0.01	0.04	<0.01	0.02	0.02	<0.01	<0.01	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	<0.02	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	----	Stnd. Units

SOURCE: 44

	04/29/87	04/29/87	04/29/87	04/29/87	04/29/87	04/28/87	04/28/87	04/28/87	04/28/87		
	BORING 4	BORING 4	BORING 4	BORING 5	BORING 5	BORING 6	BORING 6	BORING 6	BORING 6		
	Composite			Composite							
	0-8.0'	*8.0-9.5'*	*9.5-10.0'*	*0-8.0'*	*8.0-9.2'*	*1.5'*	*5.0'*	*7.5*	*9.75'*	DETECTION	
PARAMETER										LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.12	0.14	1.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.42	0.29	<0.01	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	<0.02	0.04	0.07	0.05	0.10	0.03	<0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	----	Stnd. Units

SOURCE: 44

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.05	0.21	<0.01	1.0	0.07	<0.01	0.04	0.11	0.08	0.01	mg/L
Zinc	<0.02	0.02	0.02	0.04	0.03	<0.02	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	----	Stnd. Units

SOURCE: 44

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO: Results of Analyses "As Collected" Sludge Samples Date:

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
West Lagoon						
Quadrant 1.	65	2.4	47	<0.5	--	--
Quadrant 2.	200	32	120	<0.5	--	--
Quadrant 3.	68	<2	52	<0.5	--	--
Quadrant 4.	73	3.6	58	<0.5	--	--
Composite	--	--	--	--	26.9	7.5
East Lagoon						
Quadrant 1.	180	4.6	81	<0.5	--	--
Quadrant 2.	160	6.2	90	<0.5	--	--
Quadrant 3.	72	<2	45	<0.5	--	--
Quadrant 4.	160	<2	72	0.6	--	--
Composite	--	--	--	--	29.7	8.0

* All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Date:

Results of Analyses "As Collected" Sludge Samples

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

SOURCE: 50

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

Results of EP Toxicity Procedure

Table II

TO:

Date:

Parameters:	West Lagoon Composite (FINISHING IMPOUNDMENT)	East Lagoon Composite (ROUGHING IMPOUNDMENT)	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

SOURCE: 50

SOURCE: REFERENCE NO. 8

Type III Designation Petition

for the . . .

Surface Impoundments

prepared for . . .

Quanex
Michigan Seamless Tube Division
South Lyon, Michigan

July, 1989

21157.01

EDI

ENVIRONMENTAL ENGINEERING • GEOLOGY • BIOLOGY • CHEMISTRY

TYPE III DESIGNATION FOR THE SURFACE IMPOUNDMENTS

I. Administrative Information

A. Indicate whether the waste is hazardous.

The sludge is not hazardous.

The U.S. Environmental Protection Agency's ("EPA's") first list of hazardous wastes included two wastes from steel finishing operations: (1) K062, spent pickle liquor from steel finishing operations, and (2) K063, sludge from lime treatment of spent pickle liquor from steel finishing operations. At that time, the Agency was concerned that high levels of lead and hexavalent chromium might migrate from these wastes into the environment.

On November 12, 1980, EPA deleted K063 materials from the hazardous waste list because data indicated that the hexavalent chromium and lead are present in immobile forms. Rather than listing K063 material as hazardous, the Agency temporarily retained regulatory control of this sludge under the "derived-from" rule, 40 CFR 261.3(c)(2).

EPA exempted K063 materials from this presumption of hazardousness on June 5, 1984 after reviewing additional information, including site-specific delisting petitions. In all cases, test results showed that the leachate values for hexavalent chromium and lead in the lime-stabilized sludge were well below maximum permissible EP toxicity limits.

Under the K063 exemption, waste pickle liquor sludge from the lime stabilization of spent pickle liquor is not a hazardous waste under 40 CFR 261.3(c)(2)(ii) as long as the sludge does not exhibit one or more hazardous waste characteristics. The sludge generated at the Quanex facility does not exhibit any hazardous waste characteristics and is therefore considered non-hazardous.

B. Indicate the name and site address of facility producing waste.

Quanex Corporation
Michigan Seamless Tube Division
400 McMunn
South Lyon, Michigan 48178

RECEIVED
AUG 4 1989
Waste Management
Division

C. List facility contact person and phone numbers.

Donald Comfort, P.E.
Engineering Manager
313/437-8117

D. Include signed easement statements, if applicable.

Not applicable

II. <u>Waste Stream Information</u>

A. Description of waste for which designation is requested.

Lime neutralized spent pickle liquor sludge resulting from past wastewater treatment operations that has been stabilized with flyash.

This Type III Designation Petition is for the sludge that accumulated in surface impoundments between 1970 and 1988. This sludge is characteristically different from the sludge currently being produced by manufacturing operations in that it has been solidified with a bituminous coal fly and bottom ash. The process of adding coal fly and bottom ash to the sludge is described in Section III, Manufacturing Process.

B. Amount of waste generated monthly and annually (average and maximum values).

Currently, the facility produces no waste subject to this petition. The average amounts of sludge generated at the facility are 1250 tons per month for a total of 15,000 tons per year.

C. Indicate where waste is currently disposed.

The wastes subject to this petition are located in interim status surface impoundments that are being closed pursuant to the Resource Conservation and Recovery Act (RCRA).

The sludge generated from the current wastewater treatment operations is being disposed of in an off-site Type II solid waste landfill. The sludge is separated from the waste stream in the recently renovated wastewater treatment facility located on-site. Prior to the renovation of the wastewater treatment facility in 1988, the treated waste stream was discharged directly to the surface impoundments where the sludge was allowed to accumulate.

D. Indicate proposed disposal location for designated inert or Type III wastes.

Two sludge disposal options have been evaluated. The first sludge disposal option is closure of the surface impoundments in place. This option includes an appropriately designed cover system and ground water monitoring program. The locations of the impoundments are displayed in Figure 1. The second sludge disposal option consists of removing the sludge from the surface impoundments and transporting it to an approved off-site disposal facility. The two such facilities evaluated for sludge disposal are:

1) *The Sibley Quarry Type III landfill located in Trenton, Michigan which is owned and operated by the Detroit Edison Company; and*

2) *The Rockwood landfill located in South Rockwood, Michigan which is owned and operated by Wayne Disposal, Inc.*

The available capacity of each of these facilities is being evaluated. Preliminary discussions with the landfill owners indicate that capacity restrictions may not allow sludge disposal at a single off-site landfill.

III. <u>Manufacturing Process</u>

A. Describe process used to produce wastes.

Current manufacturing processes employed at the facility are the same as those used to generate the waste subject to this petition. Quanex manufactures seamless steel tubing from round steel bars. The steel bars are first heated, pierced, and air cooled. The tubing is then immersed in a sulfuric acid pickling bath to remove the iron oxide scale formed during heating and rinsed in cold water. Any surface defects are then removed from the tubing by grinding.

The tubing is then moved to the pickle houses where a two-step zinc phosphate and sodium stearate drawing lubricant is applied by immersing the tubing in tanks. After a hot water rinse, the tubing is drawn through dies on a "draw bench" to achieve the desired diameter and shape. Tubing which requires further reduction in diameter is annealed in roller hearth furnaces to soften the steel, cleaned with acid, lubricated and drawn again.

After the tubing is cold drawn to its final size, it is straightened, cut to length, and inspected. Some material which requires ultrasonic testing is immersed in a cleaner tank which contains a combination cleaner and rust inhibitor.

The pickling operations are located in four "pickle houses". All loads of tubing pass through No. 2 pickle house to removė the scale and iron oxide, which is produced on the surface of the tubing during the heating, piercing, and cooling processes. Pickling for application of lubricant is done in all four pickle houses as required by the location of the cold draw operations. Cleaners are used in only pickle houses No. 1 and 4.

The sulfuric acid pickling bath solution contains approximately 11 percent free acid and 4 to 5 percent iron. The spent acid from the pickle houses is transferred to the waste treatment plant through enclosed underground pipelines. The other rinse waters from the pickle houses are also transferred to the waste treatment plant in the same manner.

At the waste treatment plant a lime slurry is metered into the waste stream to neutralize the acidic solutions. This mixture is aerated to maintain a suspension of solids and to promote oxidation. Lime is added automatically as necessary to maintain a pH of 9.0. The mixture is then pumped to the waste water treatment plant where the suspended solids settle out. The solids are removed from the waste stream at the wastewater treatment plant, dewatered, collected and transported off site for disposal in a licensed Type II landfill. The liquid portion of the mixture is discharged to surface waters through an NPDES outfall.

Prior to the expansion of the wastewater treatment facility in 1988, the lime-stabilized waste stream was discharged directly to the surface impoundments. The suspended solids in the waste stream then settled out in the surface impoundments before the supernatant was discharged to the surface waters through the NPDES outfall. From 1970 to 1987 sludge was periodically removed to the sludge drying beds. During this time two separate techniques were used to transport the sludge from the surface impoundments to the sludge drying beds. The first method, dredging, was used from 1971 to 1975. The second method, pumping from a barge, was used from 1975 to 1987.

Immediately after completion of the wastewater treatment facility expansion in early November 1988, the surface impoundments were taken out of service. As part of the surface impoundment closure activities, the accumulated sludge was solidified. Before the solidification process was initiated, the impoundment discharge gates were lowered to their minimum height. The free liquid was discharged to the NPDES outfall (MI 0001902). The remaining liquid below the gate level was pumped from the east impoundment into the west impoundment. The remaining liquid in the west impoundment was then pumped to the NPDES outfall.

The pickling operations are located in four "pickle houses". All loads of tubing pass through No. 2 pickle house to remove the scale and iron oxide, which is produced on the surface of the tubing during the heating, piercing, and cooling processes. Pickling for application of lubricant is done in all four pickle houses as required by the location of the cold draw operations. Cleaners are used in only pickle houses No. 1 and 4.

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Solidification of the sludge in the surface impoundments began on November 21, 1988 and was completed March 3, 1989. The estimated total mass of sludge before solidification was 30,700 tons. A total of 16,200 tons of calcium oxide solidification agent (including bituminous coal fly and bottom ash) was injected and mixed with the sludge. The estimated total mass of solidified sludge in the impoundments is thus 46,900 tons. This total mass estimate is based upon 1 cubic yard of sludge having a mass of 2,600 lbs. All the mass estimates are based upon the sludge depth recorded during the drilling of soil borings within the impoundments. The depth of the sludge varies within the impoundments apparently due to drag line operations used to remove sludge from 1971 through 1975.

The solidification process started from the southeast corner of the east impoundment and proceeded north. A John Deere 690 excavator was fitted with a manifold of four steel tubing fingers each 10 feet long. This configuration was designed to inject the fly ash mixture below the surface of the sludge to the maximum depth of the surface impoundments.

The fly ash mixture was conveyed to the excavator from a bulk pneumatic tank truck using a six-inch hose at a rate of 60 tons per hour. The excavator fingers swept back and forth from the bottom to the top of the sludge until enough material was injected to solidify the sludge in a 20-foot by 20-foot area. After setting up for 24 hours, this material was solid enough to allow the excavator to move on to the edge of the now solidified sludge and continue on to the north. This process continued until all of the sludge in both impoundments was solid.

B. Include a schematic diagram of the process.

A schematic diagram of the manufacturing process is provided in Figure 2.

C. Include a list of raw material ingredients (or material safety data sheets) used in the process. Indicate which raw material ingredients would <u>not</u> be expected to be in the waste and why.

Material safety data sheets for the raw material ingredients are provided in Appendix 1. The material safety data sheet for the bituminous coal fly and bottom ash used in the sludge solidification process is also attached in this appendix. Sulfuric acid would not be expected to be in the sludge because it is neutralized by the addition of lime.

IV. Sampling Techniques

A. Indicate name, address and contact person of facility that sampled waste stream.

EDI Engineering & Science
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, Michigan 49506

Contact Person for EDI is Kathryn Lynnes

B/C Describe sample strategy used to ensure that waste was representatively sampled. Include number of samples taken per waste stream, sampling methods used, sample preservation method used, and type of container used to collect samples.

The locations of the two surface impoundments are displayed in Figure 1. A dividing berm, approximately 20 feet wide, separates the two impoundments to form the roughing impoundment and the finishing impoundment. The roughing impoundment is located to the east of the dividing berm and the finishing impoundment to the west. The impoundments are a mirror image of each other; each is approximately 550 feet long (north to south) and 70 to 150 feet wide (west to east). The elevation of the top of the sludge in the surface impoundments is approximately 915 feet (USGS) in the roughing impoundment and 910 feet (USGS) in the finishing impoundment. The elevation of the land surface surrounding the impoundments is approximately 920 feet (USGS).

A total of eight soil borings were drilled to collect representative samples of the sludge in the surface impoundments. The field investigation to drill the soil borings in the surface impoundments was initiated and completed the week of March 27, 1989. Of the eight soil borings that were drilled, borings B-5 through B-8 (four borings) were drilled in the roughing impoundment and borings B-1 through B-4 (four borings) were drilled in the finishing impoundment (see Figure 1). The locations of the borings in the finishing impoundment (west) and the roughing impoundment (east) were drilled in the designated locations in part to avoid ponded water, hummocky terrain inaccessible to the drilling rig and extremely hard areas in which the solidified sludge could not be successfully penetrated by available drilling techniques.

The eight soil borings installed in the surface impoundments were drilled using hollow stem auger and continuous split spoon sampling techniques (ASTM Standard Method 1586-84 and 1587-83). These methods allowed for undisturbed sludge samples to be collected, sludge thickness to be determined, and the lithology to be described. The eight soil boring logs drilled in the surface impoundments are attached in Appendix 2. A summary of soil borings B-1 *through B-8 is presented in Table 1. The hollow stem augers and split spoons were steam cleaned in between the drilling of each soil boring to prevent cross contamination.*

Two sludge samples were collected from each soil boring to ensure that representative vertical sludge samples were collected. These samples were collected at distinct intervals within the thickness of the sludge layer. Table 2 displays the boring number and the intervals in which the samples were collected. A sufficient amount of sample was collected from each interval to allow appropriate laboratory analyses. The samples were placed in plastic containers and transported to EDI Engineering and Science Laboratory. The two sludge samples from each soil boring were composited in the laboratory prior to analyses. The sludge samples were composited from selected intervals in each boring to assure that there was vertical representation of the sludge with depth. No sample preservation methods were necessary. Appropriate chain-of-custody documentation was maintained.

V. <u>Sample Analysis</u>

A. Indicate name, address and contact person at laboratory.

EDI Engineering & Science
5555 Glenwood Hills Parkway, S.E.
Grand Rapids, Michigan 49506

Contact person for EDI is John Emrich - Client Service Supervisor.

B. List parameters tested for, analytical detection levels and test methods used.

The sludge samples, composited in the laboratory, were analyzed for total metals and EP toxicity for arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc. The laboratory methods used for total metal analyses and EP toxicity are presented in Tables 3 and 4 respectively.

Prior to the industry-wide delisting of the sludge by the EPA on June 5, 1984, Hydro Research Services completed a delisting petition for the K063 sludge. In the surface impoundment one composite sample from each of the roughing and finishing impoundment was collected and analyzed for EP toxicity total metals. This .eport is provided in Appendix 3.

C. Include quality assurance/quality control data to demonstrate accuracy of data.

Quality assurance/quality control data for all laboratory analyses presented are provided in Appendix 4.

D. Include analytical chemical data for all those parameters appropriate to your waste stream.

The results of the total metals and EP toxicity analyses are presented in summary Tables 6 and 7 respectively. The actual laboratory data sheets for the total metals are attached in Appendix 5 and for EP toxicity in Appendix 6.

Table 6 displays the total metal analyses for the sludge composites including one additional column labeled "average value for all sludge composites". The average value was computed using all eight analyses for each individual parameter.

The EP toxicity analyses for the sludge composites (Table 7) did not exceed the EP toxicity maximum concentration limits set forth in 40 CFR 261.21 Table 1. The maximum concentration limits are listed as an additional column in Table 7. This confirms that the sludge, as represented by the sludge samples, is not characteristically hazardous.

The EP toxicity analyses of the sludge can also be compared to the primary and secondary drinking water standards set forth in 40 CFR 141.11 and 143.3 respectively. These limits are specified in Table 3 and are also included in an additional column on Table 7. The majority of the constituents (90%) in the composited sludge samples were below the specified primary and secondary drinking water standards. The constituents that were not detected above the drinking water standards include all sludge samples analyzed for arsenic, cadmium, chromium, copper, lead and silver. Seven out of eight sludge samples for barium, six out of eight sludge samples for zinc and mercury, and five out of eight sludge samples for selenium were below the primary and secondary drinking water standards. With the exception of anomalous analytical results for mercury, all the constituents that exceeded the drinking water standards were less than two times the designated standards. The table below lists the sludge samples in which the constituents exceeded the set drinking water standards.

Analytical Parameter	Primary/Secondary Drinking Water Standards * (mg/l)	Sludge Samples Exceeding Drinking Water Standards	Detected Value (mg/l)	Less than twice Primary/Secondary Drinking Water Standards
Barium, Total	*1.0*	*B-4*	*1.1*	*Yes*
Zinc, Total	*5.0*	*B-4*	*5.9*	*Yes*
		B-7	*5.5*	*Yes*
Mercury	*0.002*	*B-2 original*	*0.027*	*No*
		B-2 Re-analyses	*0.0004*	*Yes#*
		B-5 original	*0.0082*	*No*
		B-5 Re-analyses	*0.0008*	*Yes#*
Selenium	*0.01*	*B-2*	*0.013*	*Yes*
		B-3	*0.019*	*Yes*
		B-6	*0.016*	*Yes*

** 40 CFR 141.11, 40 CFR 143.3*

 # Less than the Primary/Secondary Drinking Water Standard

The above constituents do not appear to be impacting the ground water immediately beneath the surface impoundments. Extensive historical ground water monitoring around the surface impoundments from the RCRA Interim Status Detection Monitoring Program and Ground Water Quality Assessment Plan indicates that the ground water has not been affected by the sludge. First, barium and zinc concentrations in the ground water beneath the impoundments have never statistically exceeded background levels.

Second, the extensive ground water analyses from the on-site monitoring program and the assessment plan demonstrate that mercury has never been detected in the ground water. In addition, mercury has never been used in the manufacturing process to create seamless tubing at the Quanex Facility. The two sludge samples that indicated mercury in exceedance of the drinking water standard were re-analyzed. The additional mercury analyses performed on these two sludge composite samples (B-2, B-5) did not exceed the set drinking water standards. The laboratory data sheets for the additional analyses are attached in Appendix 6 and the results are presented in Table 7. This indicated that the sludge is unlikely to be a potential source of mercury contamination.

Third, selenium has been observed only sporadically in the ground water at the facility in samples from a single monitoring well (MW12A). Selenium at MW12A has only been statistically detected above background levels once since 1987. It bears emphasizing that selenium has also been detected at the upgradient background monitoring well at the Quanex facility. Further information concerning the ground water quality under the surface impoundments is provided in the Supplementary Information for the K062 Delisting Petition presented to the MDNR in January 1989.

No other parameters were tested for because no other compounds or constituents are expected to be present in the sludge. Chloride and total sodium, potassium, magnesium, calcium and nitrogen are either not present in the sludge or are found in an immobile form and pose no threat to surface waters or ground water. Determining BOD is not necessary because there are no organics present in the sludge. The process that produces the sludge is uncomplicated and uses limited raw materials.

Figures

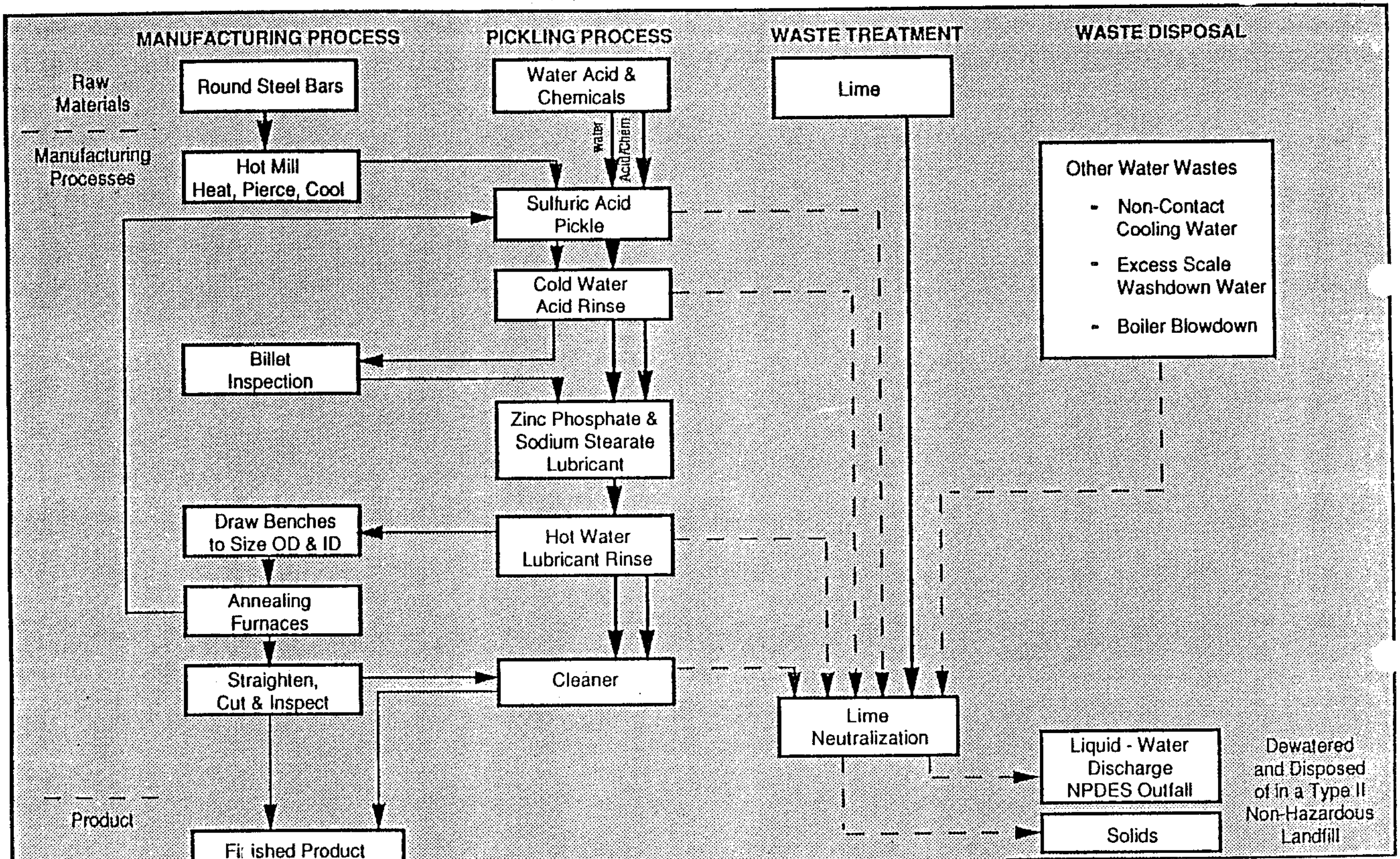


Figure 2
Manufacturing Process Flow Diagram
Delisting Petition
Quanex Corporation
Michigan Seamless Tube Division
June, 1989 21157.01

EDI Engineering & Science

SOURCE: REFERENCE NO. 33

TYPE III DESIGNATION

I. Administration Information

A. Indicate whether the waste is hazardous.

The waste sludge is not hazardous. The sludge was originally defined as a listed hazardous waste (K063 - sludge from lime treatment of spent pickle liquor from steel finishing operations) by the U.S. Environmental Protection Agency but was delisted by the Agency on June 5, 1984. This industry wide delisting became effective on December 5, 1984.

The K063 sludge was originally listed because the EPA was concerned that high levels of lead and hexavalent chromium could migrate from these wastes to the environment. The American Iron and Steel Institute (AISI) presented data to the Agency which indicated that the hexavalent chromium and lead are in an immobile form. The Agency then reviewed additional available data including a detailed evaluation of site-specific delisting petitions submitted by the iron and steel industry. In all cases, the leachate values for hexavalent chromium and lead were well below the maximum permissible EP toxicity limits. As a result of these investigations, the sludge was delisted by the EPA.

Waste pickle liquor sludge from the lime stabilization of spent pickle liquor which is produced by an individual is generally not a hazardous waste under 40 CFR 261.3(c)(2)(ii) as long as the sludge does not exhibit one or more hazardous waste characteristics. The waste sludge generated at the Quanex facility does not exhibit any of the characteristics of hazardous waste and is therefore considered non-hazardous.

B. Indicate the name and site address of facility producing waste.

Quanex Corporation
Michigan Seamless Tube Division
400 McMunn
South Lyon, Michigan 48178

C. List facility contact person and phone numbers.

Donald Comfort, P.E.
Engineering Manager
313/437-8117

D. Include signed easement statements, if applicable.

II. Waste Stream Information

A. Description of waste for which designation is requested.

Sludge resulting from the lime neutralization of spent pickle liquor.

B. Amount of waste generated monthly and annually (average and maximum values).

The average amounts of sludge generated monthly and annually are 240 tons and 2880 tons, respectively.

C. Indicate where waste is currently disposed.

The sludge generated from 1970 to 1987 was deposited in two drying beds located at the west end of the Quanex facility (see Figure A). Sludge is no longer being deposited in the two drying beds.

D. Indicate proposed disposal location for designated inert or Type III wastes.

A disposal site for the waste sludge has not been chosen at this time. A disposal location will be chosen after the MDNR has issued the waste designation.

III. Manufacturing Process

A. Describe process used to produce wastes.

Quanex manufactures seamless steel tubing from round steel bars. The steel bars are heated, pierced, and air cooled. After cooling, the tubing is immersed in a sulfuric acid pickling bath to remove the iron oxide scale formed during heating. The tubing is then immersed in cold water to remove the excess acid and moved to a billet inspection area where defects are removed.

After inspection, the tubing is again moved to the pickle houses where a two-step zinc phosphate and sodium stearate drawing lubricant is applied by immersing the tubing in tanks. The tubing is then rinsed in hot water and is ready for cold draw, the sizing of the outside diameter and wall on draw benches. Tubing which requires further reduction in diameter is annealed in roller hearth furnaces to soften the steel. After annealing, the tubing is moved to pickle houses for acid cleaning and lubricant application.

After the tubing is cold drawn to its final size, it is straightened, cut to length, and inspected. Some material which requires ultrasonic testing is immersed in a cleaner tank which contains a combination cleaner and rust inhibitor.

The pickling operations are located in four "pickle houses". All loads of tubing pass through No. 2 pickle house to remove the scale and iron oxide, which is produced on the surface of the tubing during the heating, piercing, and cooling processes. Pickling for application of lubricant is done in all for pickle houses as required by the location of the cold draw operations. Cleaners are used in only pickle houses No. 1 and 4.

The sulfuric acid pickling bath solution contains approximately 11 percent free acid and 4 to 5 percent iron. The spent acid from the pickle houses is transferred to the waste treatment plant through enclosed underground pipelines. The other rinse waters from the pickle houses are also transferred to the waste treatment plant in the same manner.

At the waste treatment plant a lime slurry is metered into the waste stream to neutralize the acidic solutions. This mixture is aerated to maintain a suspension of solids and to promote oxidation. Lime is added automatically as necessary to maintain a pH of 9.0. This mixture is then pumped to the surface impoundments where the suspended solids settle out. The liquid portion is discharged to the surface waters through an NPDES outfall.

Once a year the solids that accumulate in the surface impoundments were pumped to the drying beds. The sludge is now being accumulated in the surface impoundments pending disposition of this petition.

B. Include a schematic diagram of the process.

A schematic diagram of the manufacturing process is provided in Attachment G.

C. Include a list of raw material ingredients (or material safety data sheets) used in the process. Indicate which raw material ingredients would <u>not</u> be expected to be in the waste and why.

Material safety data sheets for the raw material ingredients are provided in Attachment J. Sulfuric acid would not be expected to be in the waste sludge because it is neutralized by the addition of lime.

IV. Sampling Techniques

A. Indicate name, address and contact person of facility that sampled waste stream.

EDI Engineering & Science
611 West Cascade Parkway, S.E.
Grand Rapids, Michigan 49506-2179

Contact person for EDI is Kathryn Lynnes

B/C Describe sample strategy used to ensure that waste was representatively sampled. Include number of samples taken per waste stream, sampling methods used, sample preservation method used, and type of container used to collect samples.

The original MDNR approved sampling plan for the two sludge drying beds is discussed in EDI Engineering & Science's letter dated February 11, 1987, to Ms. Laura Nuhn of the MDNR. The salient points of this plan are outlined below.

The original sampling plan was based on the assumption that the sludge in the drying beds was homogenous, both vertically and laterally. A systematically aligned random sampling plan was proposed to ensure that sample bias was eliminated. One grid point was to be established on the fence corner northwest of the sludge drying beds and the grid axis was to run north-south and east-west, at intervals of 120 feet. The proposed grid is shown in Attachment A.

*After the grid was established, two random numbers (x,y) were chosen both between 0 and 120, and the sampling locations were established as the location within each grid with the chosen x and y coordinates (location 0,0 representing the southwest corner of each grid interval). The two random numbers (130, 916) were arrived at by selecting two numbers from a three-digit random number table. The fraction of 120 feet was then determined by the formula (120 *N/1000) where n = three-digit random number:*

*E-W (130/1000) * 120 = 15.6 feet*
*N-S (916/1000) * 120 = 109.9 feet*

These numbers represent x and y coordinates. Sampling locations were established by starting at the southwest corner of each grid and setting a point with (x, y) coordinates 109.9 feet north and 15.6 feet east. The ten sampling locations are shown in Attachment B.

On a visit to the sludge drying bed site on April 20, 1987, it was discovered that the sludge will not support the weight of sampling personnel. This raised great concern for the safety of the people taking samples from the middle of the drying beds. After verbal consultation with Mike Czuprenski of the MDNR on April 24, 1987, it was decided that sampling locations would be moved away from the center of the drying beds. Eleven sampling locations were chosen on the perimeter of the beds, and these sites are shown in Attachment C.

Hand augers were used to obtain the sludge samples in accordance with ASTM D1452-80, "Standard Practice for Soil Investigation and Sampling by Auger Borings." The augers were rinsed with distilled water between samples to prevent cross-contamination. The samples were placed in plastic containers and brought to EDI Engineering & Science's laboratory. No sample preservation methods were necessary. Appropriate chain-of-custody documentation was maintained. Sludge boring log sheets for the eleven sampling locations are provided in Attachment D.

V. Sample Analysis

A. Indicate name, address and contact person at laboratory.

EDI Engineering & Science
611 Cascade West Parkway, S.E.
Grand Rapids, Michigan 49506-2179

Contact person for EDI is Thomas E. Campbell - Quality Assurance Supervisor.

B. List parameters tested for, analytical detection levels and test methods used.

Leachate was derived from the sludge samples following ASTM Method D 3987-81, Standard Test Method for Shake Extraction of Solid Waste with Water. The leachate derived from this method was analyzed for arsenic, barium, cadmium, chromium, lead, silver, copper, selenium, iron, manganese, mercury, nitrate, pH, and zinc. These parameters were chosen from the list of inorganic parameters which have primary or secondary drinking water standards listed in 40 CFR 141.11 and 143.3 (see Attachment E). The leachate was analyzed using Method 200.289 from Standard Methods for the Examination of Water and Wastewater, 15th Edition, APHA, AWWA, CWPCF, 1980, or Method 303 A-E from Methods for Chemical Analysis for Water and Wastes, USEPA60014-79-020, revised March, 1982.

Prior to the industry-wide delisting of the sludge by the EPA on June 5, 1984, Hydro Research Services completed a delisting petition for the K063 sludge. The report contains representative EP toxicity data. This report is provided in Attachment H.

C. Include quality assurance/quality control data to demonstrate accuracy of data.

Quality assurance/quality control data is provided in Attachment I.

D. Include analytical chemical data for all those parameters appropriate to your waste stream.

The results and analytical detection levels for the parameters tested for are provided in Attachment F. The results of the EP toxicity testing are provided in Attachment H.

No other parameters were tested for because no other compounds or constituents are expected to be present in the waste sludge. Chloride and total sodium, potassium, magnesium, calcium and nitrogen are either not present in the sludge or are found in an immobile form and pose no threat to surface waters or groundwater. Determining BOD is not necessary because these are no organics present in the sludge. The process that produces the waste sludge is uncomplicated and uses limited raw materials.

ATTACHMENT F-2

CHEMICAL ANALYSIS OF SLUDGE SAMPLES
(DETECTED CONSTITUENTS ONLY)

See II. B. in the beginning summary to find out ~~the~~ all the parameters that were tested for. These are detected constituents.

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	--	2.0	--	--	--	--	--	--	--	2.0	ug/L
Lead	--	--	--	--	0.21	0.11	--	0.15	0.47	0.05	mg/L
Iron	--	0.01	--	0.04	--	0.02	0.02	--	--	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	--	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	---	Std. Units

PARAMETER	04/29/87 BORING 4 Composite 0-8.0'	04/29/87 BORING 4 8.0-9.5'	04/29/87 BORING 4 9.5-10.0'	04/29/87 BORING 5 Composite 0-8.0'	04/29/87 BORING 5 8.0-9.2'	04/28/87 BORING 6 1.5'	04/28/87 BORING 6 5.0'	04/28/87 BORING 6 7.5	04/28/87 BORING 6 9.75'	DETECTION LIMIT	UNITS
Lead	0.12	0.14	1.8	--	--	--	--	--	--	0.05	mg/L
Iron	0.02	0.04	--	--	--	--	--	--	--	0.01	mg/L
Manganese	0.42	0.29	--	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	--	0.04	0.07	0.05	0.10	0.03		0.02	mg/L
Nitrogen, Nitrate	--	--	--	--	--	--	0.28	--	--	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	---	Std. Units

	04/29/87	04/29/27	04/29/87	04/29/87	04/29/87	04/29/87	04/29/87	04/29/87	04/29/87		
	BORING 7	BORING 7 Composite	BORING 7	BORING 8	BORING 8 Composite	BORING 8	BORING 9 Composite	BORING 10 Composite	BORING 11 Composite		
	0-0.5'	*1.0-6.2'*	*6.2-6.5'*	*0-1.5'*	*2.0-5.0'*	*5.5-6.0'*	*0-5.0'*	*0-5.0'*	*0-6.0'*		
PARAMETER										DETECTION LIMIT	UNITS
d	0.05	–	–	–	–	–	–	–	–	0.05	mg/L
Mercury	–	–	–	–	–	–	–	–	0.78	0.50	ug/L
Silver	–	–	–	–	–	–	–	–	0.06	0.01	mg/L
Manganese	0.05	0.21	–	1.0	0.07	–	0.04	0.11	0.08	0.01	mg/L
Zinc		0.02	0.02	0.04	0.03	–	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	–	–	–	–	–	0.08	–	–	–	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	—	Std. Units

ATTACHMENT G

Schematic Diagram of Manufacturing Process

CLOW
HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

34-1630
34-4747

TO:

Totals

Results of Analyses "As Collected" Sludge Samples

Date:

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9 ppm	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

400 Auburn Avenue
Pontiac, MI 48058

31[illegible] 1630
31[illegible] 4747

Results of EP Toxicity Procedure

Table II

TO:

EP tox

Date:

Parameters:	West Lagoon Composite	East Lagoon Composite	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information: Final pH *	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

SOURCE: REFERENCE NO. 44

611 Cascade West Parkway, SE • Grand Rapids, Michigan 49506-2179 • (616) 942-9600

EDI Engineering & Science
Environmental Engineering
Geology, Biology and Chemistry

June 26, 1987

JUL 1

Mr. Mike Czuprenski
Michigan Department of Natural Resources
Groundwater Quality Division
1550 Sheldon
Northville, MI 48167

RE: QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISON
SOUTH LYON, MICHIGAN - SLUDGE DRYING BEDS

Dear Mike:

Our original approved sampling plan for the two sludge drying beds at the Michigan Seamless Tube Division of Quanex Corporation, South Lyon, Michigan, is discussed in our letter dated February 11, 1987 to Ms. Laura Nuhn of the MDNR. The purpose of the sampling plan is to determine if the solids in the drying beds are inert. In order to carry out this purpose, the original approved sampling plan needed to be modified. This was necessitated by the unsafe working conditions at the drying beds.

In our original sampling plan, we proposed to eliminate sample bias by using systematically aligned random sampling. In this systematically aligned random sampling plane, a grid with a grid interval of 120 feet was chosen for the sludge drying beds. To establish a repeatable grid, one grid point was to be established on the fence corner northwest of the sludge drying beds and the grid axis was to run north-south and east-west. This proposed grid is shown in Attachment A.

Next, two random numbers (x, y) were chosen both between 0 and 120, and the sampling locations were established as the location within each grid with the x and y coordinates. (Location 0,0 will represent the southwest corner of each grid interval). The two random

a subsidiary of WW Engineering & Science

numbers (x, y) were arrived at by first looking up two numbers from a three-digit random number table. The fraction of 120 feet was determined by the formula (120 * n/1000) where n = three-digit random number. The two random numbers are 130 and 916, so:

E-W (130/1000) * 120 = 15.6 feet
N-S (916/1000) * 120 = 109.9 feet

These numbers represent x and y. Therefore, starting at the southwest corner, a distance of 109.9 feet is traveled north and then a distance of 15.6 feet is traveled east. This establishes the sampling location within each grid. Using this method, ten sites would fall within the sludge drying beds. These sites are shown on Attachment B.

Considering the expected absence of lateral variation within the sludge beds, this was determined to be a sufficient number of sampling locations to describe the wastes. If any unexpected variations were observed, a second round of sampling would have been initiated.

On a visit to the sludge drying bed site on April 20, 1987, it was discovered that when a person tried to walk on the sludge, that person would sink about a foot into it. This raised great concern for the safety of the people taking core samples from the middle of the drying beds. Therefore, after verbal consultation with you on April 24, 1987, it was decided that the location of the sampling sites would be moved away from the center of the drying beds. Eleven sites were chosen on the perimeter of the beds, and these sites are shown on Attachment C.

We originally proposed to take sludge samples at each location by driving 1-1/2 inch PVC casing through the sludge and then pulling the casing out. The sediment inside the casing would be pushed out with a rod on to a plastic tarp. However, because of the consistency of the sludge, it would not enter the PVC casing. This was confirmed by the use of a split-spoon screen. Hand augers were then used to obtain the samples. The samples were placed in a plastic container and brought to EDI Engineering & Science's laboratory. Appropriate chain-of-custody documentation was maintained. Sludge boring log sheets for the 11 sample sites are found in Attachment D.

Leachate was derived from the sludge samples following ASTM Method D 3987-81, Standard Test Method for Shake Extraction of Solid Waste with Water. The leachates from these analyses were analyzed for arsenic, barium, cadmium, chromium, lead, silver, copper, selenium, iron, manganese, mercury, nitrate, pH, and zinc. These parameters were chosen from the list of inorganic parameters which have primary or secondary drinking water standards (40 CFR 141.11 and 143.3) which are found in Attachment E. The leachates were analyzed using Method 200-289 from Standard Methods for the Examination of Water and Wastewater, 15th Edition, APHA, AWWA, GWPCF, 1980, or

Method 303 A-E from Methods for Chemical Analysis for Water and Wastes, USEPA60014-79-020, revised March, 1982. These results are found in Attachment F.

The results of the analyses done on the sludge samples were then compared to the primary and secondary drinking water standards. Based on this comparison, the sludge has been determined not to be inert because the levels of manganese and lead exceed these standards. As a result of these analyses, we will be evaluating our options under Michigan Act 641 and will be in contact with you by the end of July. Please call me or Jim Tolbert if you have any questions.

lagoon closure ?

ongoing funding
gw monitoring

Sincerely,

EDI ENGINEERING & SCIENCE

Kathryn D. Lynnes for
Manager, Regulatory Compliance

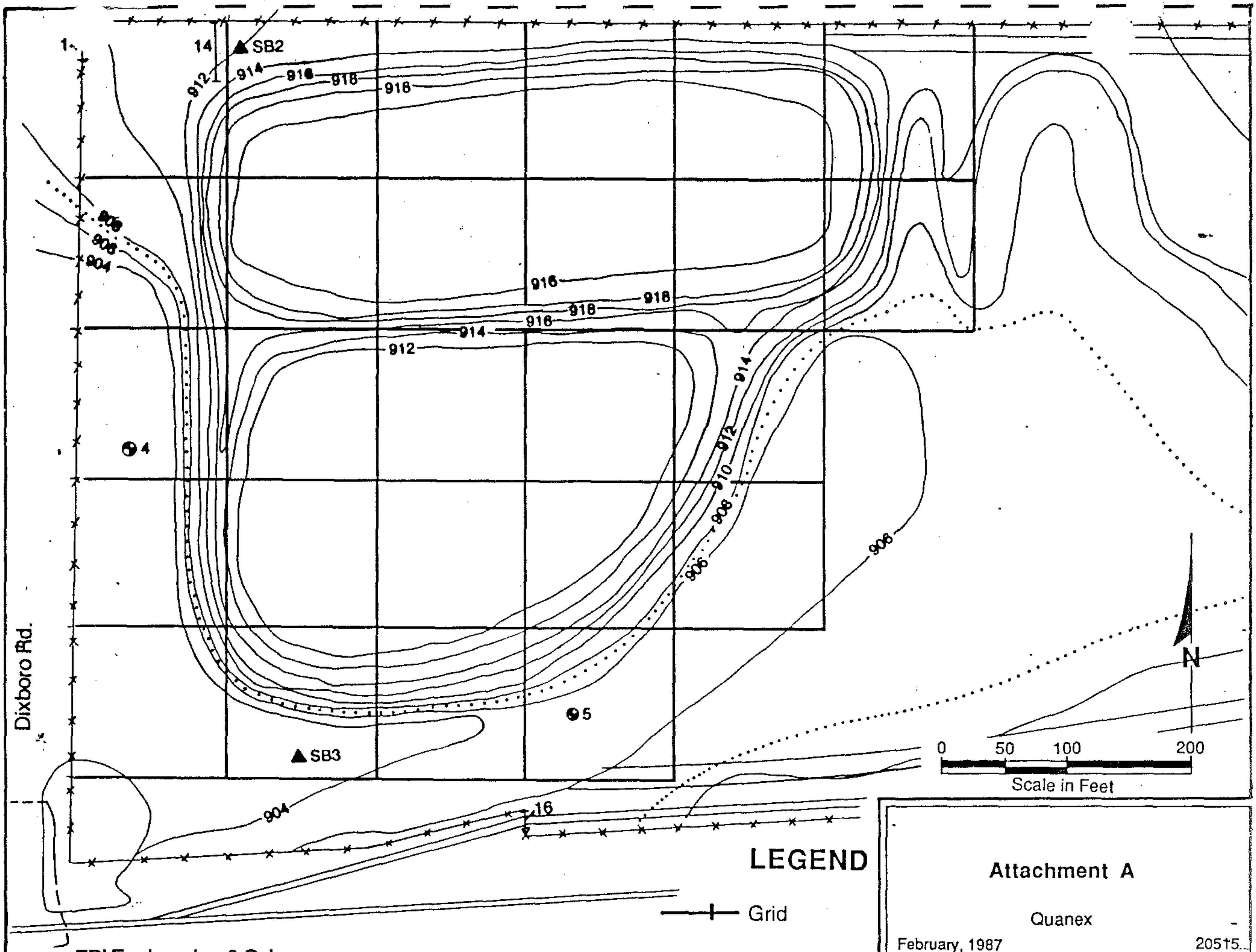
KDL/mck

Enclosures

cc: Don Comfort

ATTACHMENT A

PROPOSED GRID



Attachment A

Quanex

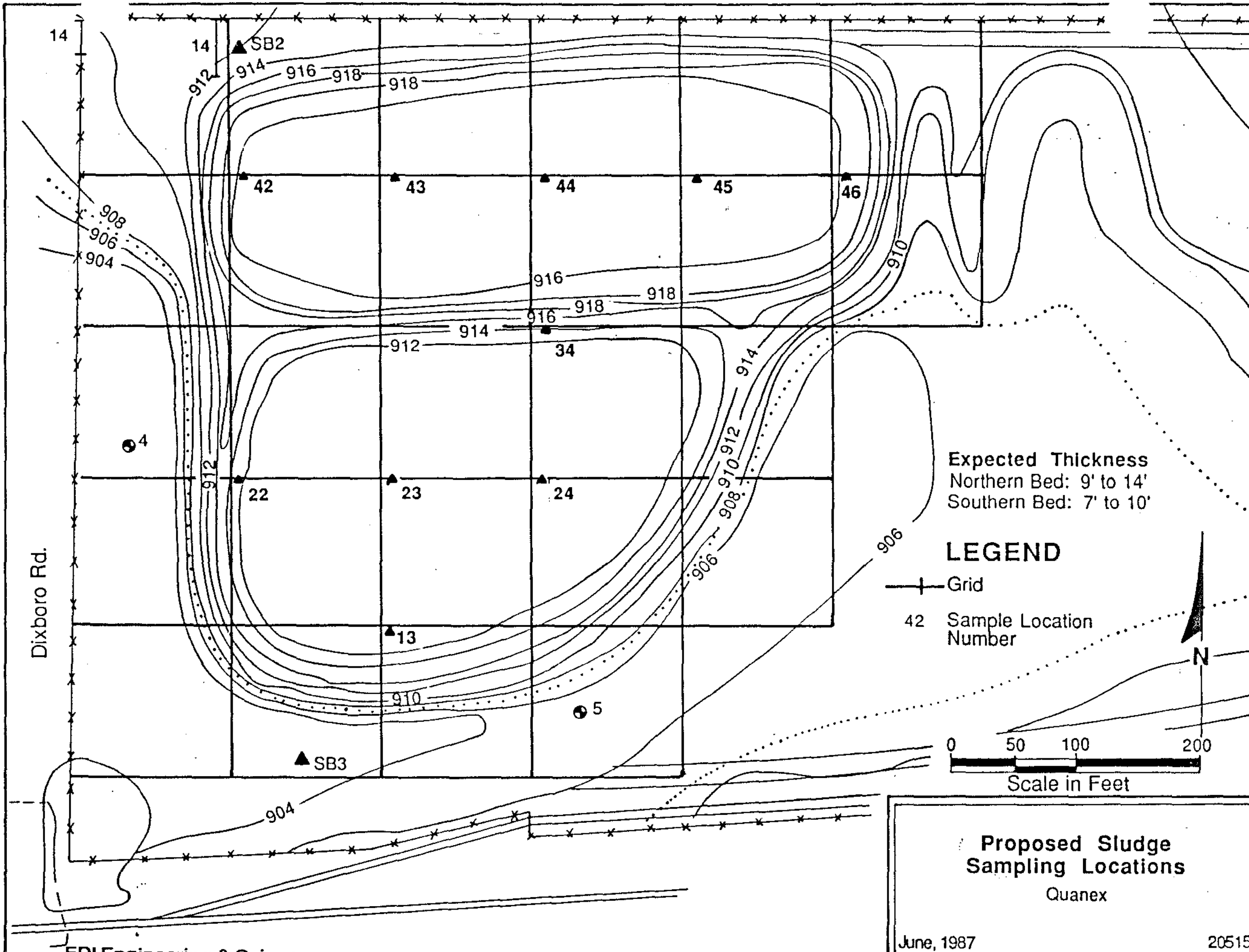
February, 1987

20515

EDI Engineering & Science

ATTACHMENT B

PROPOSED SLUDGE SAMPLING LOCATIONS



Proposed Sludge Sampling Locations

Quanex

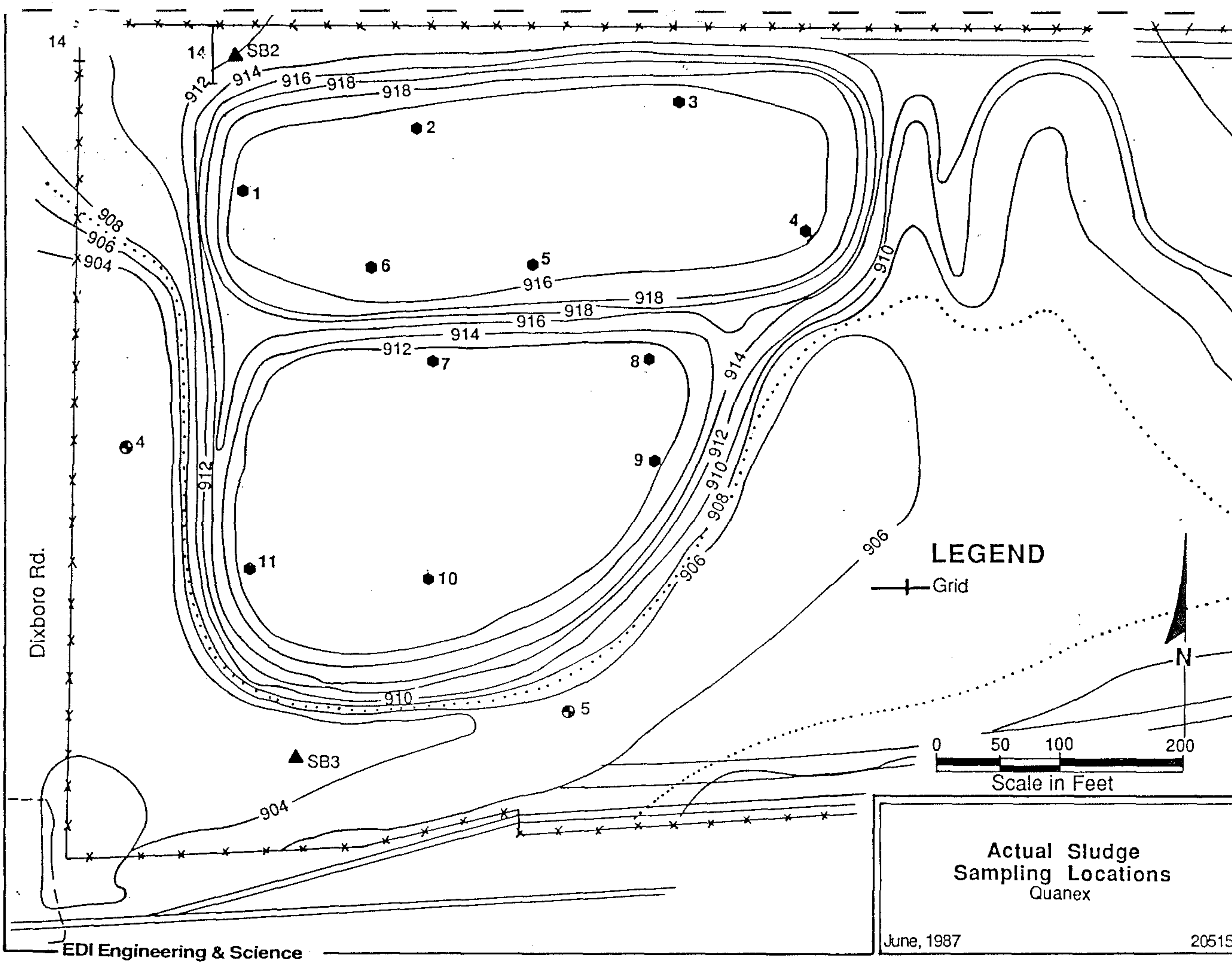
June, 1987

20515

EDI Engineering & Science

ATTACHMENT C

ACTUAL SLUDGE
SAMPLING LOCATIONS



Actual Sludge Sampling Locations
Quanex

June, 1987

20515

EDI Engineering & Science

ATTACHMENT E

PRIMARY DRINKING WATER STANDARDS
(40 CFR 141.11)

ATTACHMENT E

PRIMARY DRINKING WATER STANDARDS
(40 CFR 141.11)

	mg/L
Arsenic	0.05
Barium	1.0
Cadmium	0.010
Chromium	0.05
Lead	0.05
Selenium	0.01
Silver	0.05
Mercury	0.002
Nitrate (as N)	10.0

SECONDARY DRINKING WATER STANDARDS
(40 CFR 143.3)

	mg/L
Copper	1.0
Iron	0.3
Manganese	0.05
pH	6.5-8.5 (pH Units)
Zinc	5.0

ATTACHMENT F

CHEMICAL ANALYSIS OF SLUDGE SAMPLES

PARAMETER	04/28/87 BORING 1 0.0-1.5'	04/28/87 BORING 1 5.0-6.0'	04/28/87 BORING 1 8.75'	04/28/87 BORING 1 9.5'	04/28/87 BORING 2 3.0'	04/28/87 BORING 2 6.25-7.25'	04/28/87 BORING 2 8'	04/29/87 BORING 3 Composite 0-4'	04/29/87 BORING 3 Composite 5.0-9.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.0.5	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	<0.05	<0.08	<0.05	<0.06	0.21	0.11	<0.05	0.15	0.47	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	0.01	<0.01	0.04	<0.01	0.02	0.02	<0.01	<0.01	0.01	mg/L
Manganese	0.10	0.11	0.36	0.35	0.30	0.54	0.28	0.12	0.60	0.01	mg/L
Zinc	<0.02	0.03	0.05	0.03	0.06	0.17	0.04	0.03	0.07	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
pH (after leaching)	7.34	7.56	7.24	7.59	7.47	7.50	7.31	7.68	7.36	----	Stnd. Units

PARAMETER	04/29/87 BORING 4 Composite 0-8.0'	04/29/87 BORING 4 8.0-9.5'	04/29/87 BORING 4 9.5-10.0'	04/29/87 BORING 5 Composite 0-8.0'	04/29/87 BORING 5 8.0-9.2'	04/28/87 BORING 6 1.5'	04/28/87 BORING 6 5.0'	04/28/87 BORING 6 7.5	04/28/87 BORING 6 9.75'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.12	0.14	1.8	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	0.02	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.42	0.29	<0.01	0.10	0.52	0.05	0.10	0.17	0.16	0.01	mg/L
Zinc	0.08	0.03	<0.02	0.04	0.07	0.05	0.10	0.03	<0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.28	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.62	7.27	8.16	7.22	7.45	7.64	7.59	7.22	7.79	----	Stnd. Units

PARAMETER	04/29/87 BORING 7 0-0.5'	04/29/27 BORING 7 Composite 1.0-6.2'	04/29/87 BORING 7 6.2-6.5'	04/29/87 BORING 8 0-1.5'	04/29/87 BORING 8 Composite 2.0-5.0'	04/29/87 BORING 8 5.5-6.0'	04/29/87 BORING 9 Composite 0-5.0'	04/29/87 BORING 10 Composite 0-5.0'	04/29/87 BORING 11 Composite 0-6.0'	DETECTION LIMIT	UNITS
Arsenic	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Barium	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	mg/L
Cadmium	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Chromium	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Lead	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	mg/L
Mercury	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.78	0.50	ug/L
Selenium	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	ug/L
Silver	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.06	0.01	mg/L
Copper	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Iron	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	mg/L
Manganese	0.05	0.21	<0.01	1.0	0.07	<0.01	0.04	0.11	0.08	0.01	mg/L
Zinc	<0.02	0.02	0.02	0.04	0.03	<0.02	0.03	0.03	0.02	0.02	mg/L
Nitrogen, Nitrate	<0.05	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	0.05	mg/L
pH Value after leach	7.64	7.56	7.75	7.55	7.61	7.49	7.69	7.69	7.65	----	Stnd. Units

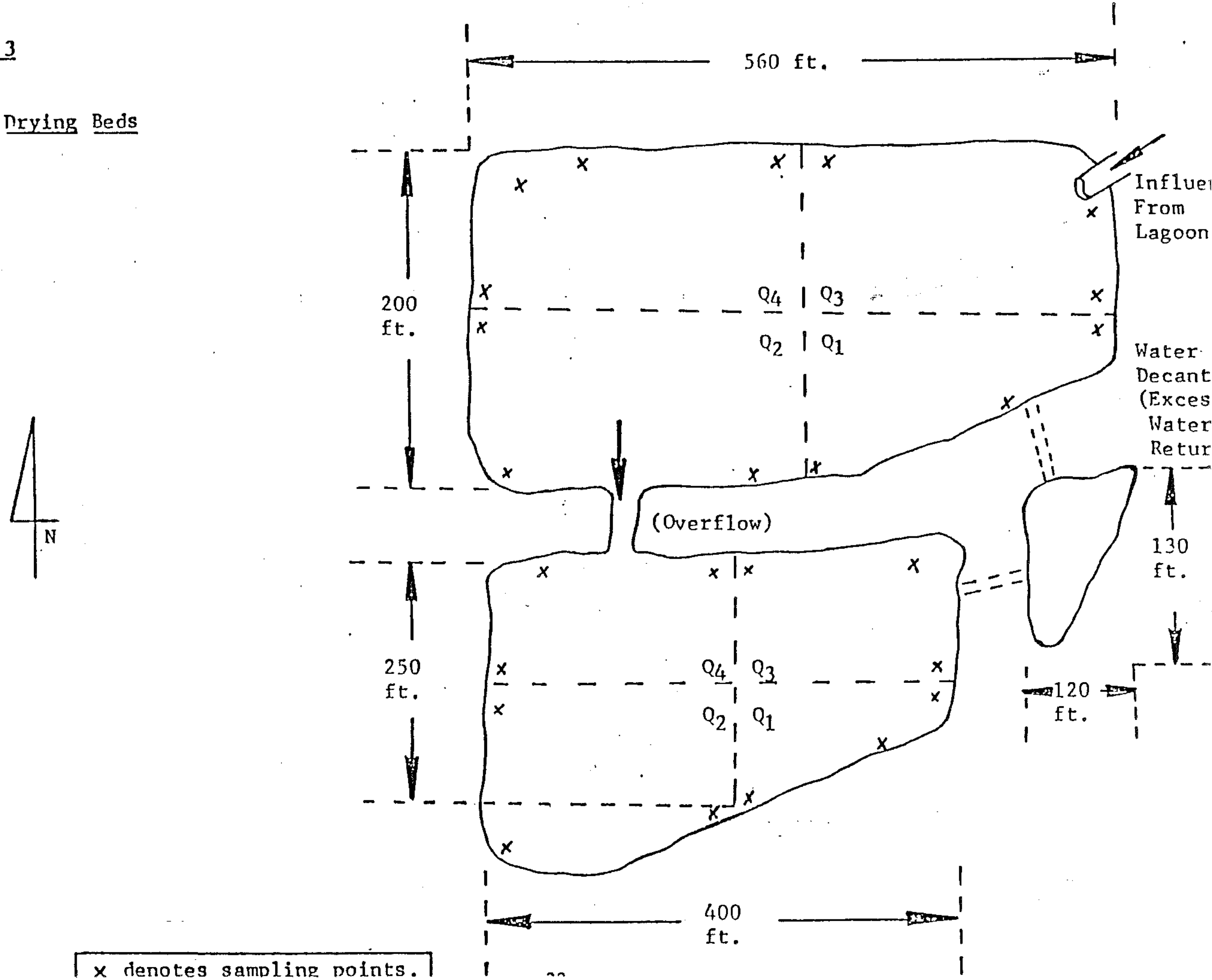
SOURCE: REFERENCE NO. 50

ATTACHMENT C

Previous Analysis on the Sludge

Figure 3

Sludge Drying Beds



x denotes sampling points.

Sampling and Analysis

Sampling and analyses were performed by Hydro Research Services. Sampling took place on October 11, 1982.

Personnel and equipment used in the collection and analyses of samples are presented in the Appendix.

Both lagoons and drying beds were divided into four quadrants each (see Figures 2 and 3). A minimum of 3 core samples were taken in each quadrant and a composite of each quadrant made in a glass jar. Samples were then transported back to the laboratory for analysis.

Samples were then logged in after delivery to the laboratory, assigned a laboratory number, mixed well, and then portioned for analysis.

"As collected" samples from each quadrant in each lagoon were then analyzed for : Total Chromium, Total Cyanide, Lead, and Nickel.

The results of these analyses are presented in Table I.

A composite of equal weights of sample from each quadrant were then made yielding a composite sample for each lagoon and drying bed. These samples were then analyzed for pH and Total Solids. (See Table I for results).

The EP Toxicity procedure was then performed on these composite sludges. The EP Toxicity leachate was analyzed for the following parameters: Arsenic, Barium, Cadmium, Chromium-Total, Copper, Lead, Mercury, Nickel, Selenium, Silver, Zinc, and Total Cyanides. Results of the above analyses are presented in Table II.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Results of Analyses "As Collected" Sludge Samples **Date:**

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
West Lagoon						
Quadrant 1.	65	2.4	47	<0.5	--	--
Quadrant 2.	200	32	120	<0.5	--	--
Quadrant 3.	68	<2	52	<0.5	--	--
Quadrant 4.	73	3.6	58	<0.5	--	--
Composite	--	--	--	--	26.9	7.5
East Lagoon						
Quadrant 1.	180	4.6	81	<0.5	--	--
Quadrant 2.	160	6.2	90	<0.5	--	--
Quadrant 3.	72	<2	45	<0.5	--	--
Quadrant 4.	160	<2	72	0.6	--	--
Composite	--	--	--	--	29.7	8.0

* All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

TO:

Date:

Results of Analyses "As Collected" Sludge Samples

Table I

Sample Identification:	Chromium Total, mg/kg	Lead Total, mg/kg	Nickel Total, mg/kg	Cyanide Total, mg/kg	Total Solids,%	pH
South Drying Bed						
Quadrant 1.	180	<2	110	<0.5	--	--
Quadrant 2.	220	<2	120	<0.5	--	--
Quadrant 3.	200	<2	110	<0.5	--	--
Quadrant 4.	200	4.9	99	<0.5	--	--
Composite	--	--	--	--	34.8	7.5
North Drying Bed						
Quadrant 1.	200	<2	100	<0.5	--	--
Quadrant 2.	250	<2	140	<0.5	--	--
Quadrant 3.	230	2.8	140	<0.5	--	--
Quadrant 4.	220	<2	120	<0.5	--	--
Composite	--	--	--	--	32.6	7.7

*All results reported on samples as collected.

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

408 Auburn Avenue
Pontiac, MI 48058

313 334-1630
313 334-4747

Results of EP Toxicity Procedure

TO:

Table II

Date:

Parameters:	West Lagoon Composite	East Lagoon Composite	North Drying Bed Composite	North Drying Bed Composite	Average
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005
Barium	<0.1	<0.1	0.5	0.6	<0.33
Cadmium	0.05	0.05	0.05	0.05	0.05
Chromium, Total	<0.02	<0.02	<0.02	<0.02	<0.02
Copper	0.008	0.005	0.06	0.05	0.06
Lead	0.25	<0.05	<0.05	<0.05	<0.05
Mercury	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Nickel	0.54	0.45	0.88	0.60	0.62
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	0.02	0.03	0.02	0.02	0.02
Zinc	0.36	0.19	0.62	0.39	0.39
Cyanide, Total	<0.02	<0.02	<0.02	<0.02	<0.02
pH Adjustment Information:					
Final pH	7.1	7.2	6.9	7.1	--
#mls of 0.5 N Acetic Acid added per gm. of sample	4.0	4.0	4.0	4.0	4.0

* All results reported in mg/l.

Data Analysis

A linear regression analysis was performed on the results obtained from all EP Toxicity leachate parameters analyzed for according to U.S. EPA SW-846, Section 8.49-6.

The results obtained by linear regression on the values of standard concentrations vs. observed concentrations were calculated as a line slope and reported as a percent.

All data obtained were well within specified limits, as few interferences were present.

Discussion/Summary

The results of Table I demonstrate that this sludge is fairly consistent with respect to those elements of concern analyzed for in the "as collected" waste material.

Data presented in Table II clearly show that the lime neutralization process utilized here has been effective in stabilizing this waste material even under EP Toxicity procedure conditions. Although the maximum allowable amount of acid was added during this test, the pH of the leachate did not fall below 6.9.

At no time did the concentrations of those elements of concern exceed EP Toxicity limits and, in most cases, these were below the limits of detection.

In addition, the waste water effluent associated with this waste treatment process has been discharged to local water ways for a number of years. Monitoring data obtained over the last several years under the NPDES permit system (Permit #MI001902) have shown an effluent consistently within permit limitations.

In summary, it has been shown that this sludge does not meet the criteria for which it has been listed as a hazardous waste material and, therefore, it should be delisted.

This delisting will enable the Michigan Seamless Tube Division to more economically dispose of this waste material when the necessity arises for dredging of our lagoons and drying beds.

Appendix I

Sampling and analysis was performed by Hydro Research Services, 408 Auburn Avenue, Pontiac, MI 48058.

I. Sampling

Collection:	Alan Hahn
Dates:	October 11, 1982
Method:	Polycarbonate coring tube.
Storage:	Glass jar.

II. Analytical Procedures

A. Sludge Samples

Metals analyzed followed Methods 8.54, 8.56 and 8.58 of Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, US EPA SW-846.

Metals analysis was performed by Cecilia Vernaci and supervised by Linda Deans, General Laboratory Manager.

Total cyanide was determined by Method 335.2, Methods for Chemical Analysis of Water and Wastes, 1979, EPA-600/4-79-020 performed by Nancy Campbell and Susan Scott; supervised by Linda Deans, General Laboratory Manager.

B. EP Methodology

The EP Toxicity was performed according to Section 7 procedures as outlined in US EPA SW-846.

All metals analyzed for were analyzed according to Methods 8.51 through 8.54, and 8.56 through 8.60 of EPA SW-846.

Copper and Zinc analysis followed Methods 220.1 and 289.1, respectively, of Methods for Chemical Analysis of Water and Wastes, 1979, EPA-600/4-79-020.

All metals analyses were performed by Cecilia Vernaci and supervised by Linda Deans, General Laboratory Manager.

Total cyanide was analyzed for according to Method 335.2, Methods for Chemical Analysis of Water and Wastes, 1979.

Appendix I Continued

The EP extraction procedure and cyanide analyses were performed by Nancy Campbell and Susan Scott; and supervised by Linda Deans, General Laboratory Manager.

C. Instrumentation

Atomic Absorption Spectrophotometer:
Instrumentation Labs Model IL-951

UV-Visible Spectrophotometer:
Bausch and Lomb Model 88

pH Meter
Corning Model 110

D. Personnel Qualifications

See Appendix II

APPENDIX C

PHOTOGRAPH LOG

PHOTOGRAPH 1: Fuel Oil Tanks.

PHOTOGRAPH 2: Oil and Lubricant Drum Storage Area.

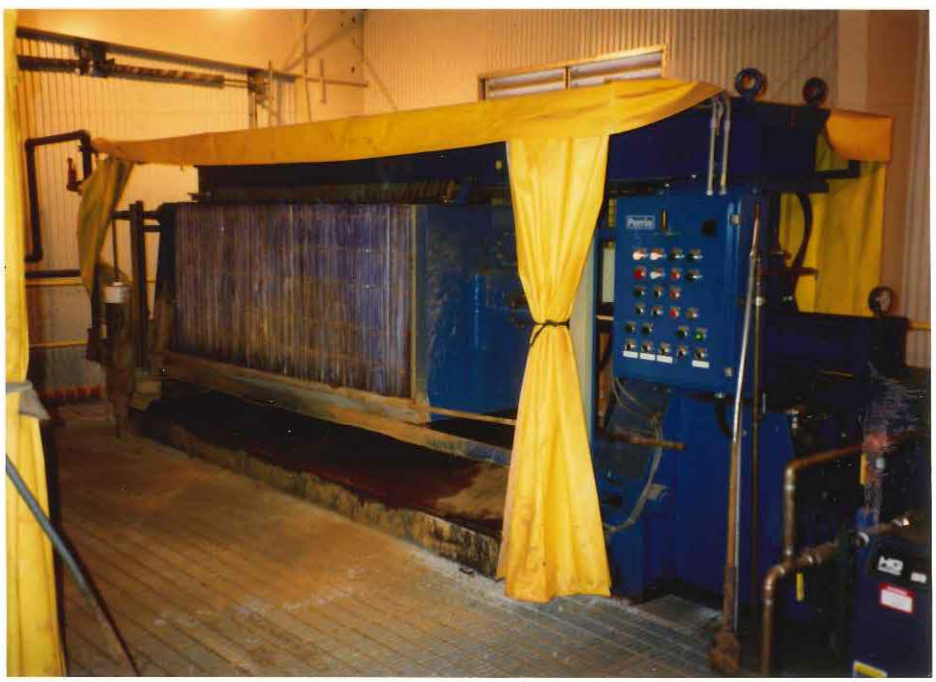
PHOTOGRAPH 3: Sulfuric Acid Storage Tanks.

PHOTOGRAPH 4: Bonderite Storage Tanks.

PHOTOGRAPH 5: Neutralization Plant.

PHOTOGRAPH 6: Surface Impoundments.

PHOTOGRAPH 7: Surface Impoundments.



PHOTOGRAPH 8: Filter Press.

PHOTOGRAPH 9: Uncovered Berm Debris.

PHOTOGRAPH 10: Uncovered Derm Debris.

PHOTOGRAPH 11: Former HW Storage Area B (clean closed).

PHOTOGRAPH 12: Empty barrel storage area.

PHOTOGRAPH 13: Active waste oil storage tank and drums.

PHOTOGRAPH 14: Active waste oil storage tank and drums.

PHOTOGRAPH 15: Former landfill waste pile (scrap equipment storage prior to disassembly and removal).

PHOTOGRAPH 16: Former landfill waste pile.

PHOTOGRAPH 17: Former landfill/waste pile.

PHOTOGRAPH 18: Surface Impoundment Outfall Culvert to Yerkes Drain.

PHOTOGRAPH 19: New above-grade fuel and gasoline storage tanks.

PHOTOGRAPH 20: Previous location of gasoline and diesel fuel USTs (removed).

PHOTOGRAPH 21: Previous location of gasoline and diesel fuel USTs (removed).

PHOTOGRAPH 22: One of three similar fuel oil interceptors for Yerkes Drain.

PHOTOGRAPH 23: Yerkes Drain.

PHOTOGRAPH 24: Plant outfall discharge into Yerkes Drain.

PHOTOGRAPH 25: Northern sludge drying bed.

PHOTOGRAPH 26: Northern sludge drying bed; southern bed is beyond berm shown.

PHOTOGRAPH 27: Absorbant fuel oil boom on Yerkes Drain.

APPENDIX D

VSI FIELD LOG NOTES

Sect. 2.3.3 - 1st sentence may not apply since collection equipt. is in place

Sect. 2.4.3 - Yerkes Drain and Inchwagh Lake

Sect. 2.5 - Four pickle tanks have fan ventilation and two share a scrubber, there are six annealing furnaces now and the burners are actually boilers. Note that the boilers are natural gas run and oil is only kept on line in case of an emergency. Also have 2 reheat furnaces, a rotary and walking-beam furnaces, which share one stack.

Sect. 2.5.2 - No testing has been found to be necessary, no complaints, only testing which would be done is if an emission problem was visual.

Sect. 2.6 - Seeping from HW Area B is speculation only, the closure testing proved otherwise.

\- S.D. Beds & impoundment sludge constituents are immoble, check & verify this release info!

Sect. 2.6.1 - HW storage Area B was certified closed by MDNR on 2/5/90.

\- impoundments are inactive & stabilized

2.6.1 (cont.). - and therefore practically closed but not "officially" certified closed.
- former acid pits may have contained treated K062 wastes as did surf. impoundments.
- surf. impoundments have not been cleaned up, just stabilized

Sect. 2.6.2 - Make a <u>very</u> clear distinction between what was found in the soil and what was found in the sludge.

Sect. 2.7.1 - No source existing

Sect. 2.7.2 - No monitoring since no source

Sect. 3.1 - State certified as Type III (?) & not inert

Sect. 3.1A - Impoundments were used for retention but not make for that purpose. Sludge depth in finishing lagoon ≈ 3' and in roughing lagoon ≈ 7'-14'.

Sect. 3.1C - K063 waste type was proposed only, never official
- delisted in 1985 or 1984? check
- Volume approx 46900 CY after stabilization.
- Constituents - ISWPLS, be <u>very</u> careful as the word "constituents" implies something which may not be true with ISWPLS immobilized contents

rephrase

Sect. 3.5 - Not a debris pile, just debris
- waiting for approval of a work plan

Sect. 3.5 A - historic staging area for scrap.

Sect. 3.5C - 30-40 feet long, not 180 feet

Sect. 3.6B - B: 1985-89
C: 1980 - present

Sect 3.6C - B: only barium & corrosives, short term (one time only), ≈100 gal Ba (3 drm
C: waste oil; 10,000 gal tank

Sect. 3.6D - 150% containment

Sect. 3.6E - No releases from either.

Sect. 3.7 - Remove from report

Sect. 3.8 - USTs removed 10/88 under LUST program, remove

Sect. 3.9, 3.10, 3.11, 3.12, 3.13 & 3.15 → remove from report, process areas not SWMUs.

Sect. 3.14A - mill bldg, not main office

Sect. 3.14C - 280,000 gallons, not 420,000

Sect. 3.15 → filter press sludges shipped to Type II landfill.

5 Sept 90

1. HW Container Storage Unit Closure approved by MDNR. Q will send ~~letter.~~ → Given copy during mtg.

2. Sludge drying beds do not have a closure plan. Q is trying to get Type III designation.

3. WW flow is 1 MGD.

4. Sodium Sterate is used in addition to zinc phosphate.

5. Residents have city water. Groundwater wells for watering purposes.

6. Spill was between 0.1 280,000 - 420,000 gallons
Send File

7. Section 2.3.1 Q waiting for cleanup approval for debris located in surface impoundment.

8. Old NPDES permit has been extended. New permit has been applied for that will reduce discharge & increase concentration.

9. Surface impoundments have been treated with lime to stabilize.

10. Not a debris pile. (2.6)

11. Storage pad has been closed & certified.

12. (2.6.1) Closed but certification is pending.

13. (2.6.1) Spent pickle liquor can release zinc, chromium & lead.

14. (2.6.2) Clarify to specify where contaminants come from. (Soil & Sludge)

15. (3.1 Surface Impoundments) MDNR approved material as Type III ~~10 to 15 feet deep~~
KO63 was proposed number only
Lime stabilized pickle Liquor sludge.
Gate was used to release effluent, Clay line

16. (3.2 Sludge Drying Beds) ~~Closure pending~~ Closure not required because sludge is Type III.
Same but has not been solidified.
<u>May Remove.</u>

17. (3.3 Acid Pits) Nuetralized w/ lime. May have been excavated during construction.
Lime stabilized pickle liquor sludge.

18. 3.4 (Former Landfill /Wastepile)
Retired equipment

NPDES Permit

19. (3.5 Uncovered Debris Pile)

20. (3.6 Former HW Container Storage Facilities)

21. 3.8 Contaminated soil removed.

CHECK W/ GARY ABOUT REVIEW

Call Mr. Comfort.

M&E
TPSKI
9/5/90

Quanex Corp- MST Photo log

Picture No.	Description
8	Fuel Oil Tanks
9	Oil & Lubricant Drum Storage
10	Sulfuric Acid Storage Tanks
11	Bonderite Storage Tanks
12	Neutralization Plant
13 & 14	Surface Impoundments
15	Filter Press (2 in place, one not photographed)
16 & 17	Uncovered Berm Debris
18	HW Storage Area B (former loc.)
19	Empty barrel storage area adjacent to Area B
20 & 21	Area C-HW Storage Area, Waste Oil tank & drums (note sump).
22, 23 & 24	Retired equipt. & scrap metal area
25	outfall drainage & culvert to Yerkes Drain
26	New above-grade fuel oil & gasoline tanks (replaced USTs which were removed in another location).
27 & 1 (New roll)	Former location of USTs for fuel oil & gasoline (removed under LUST program).

9/5/90

Photo	Descript.
2	Fuel oil interceptor/collection equipt. near Yerkes Drain
3	Yerkes Drain
4	Outfall into Yerkes Drain from plant property
5	Northern-most sludge drying bed
6	North drying bed, south bed is just beyond berm shown.
7	Absorbant oil boom on Yerkes Drain

APPENDIX E

FACILITY FILE: SAMPLING RESULTS AND MONITORING DATA

SOURCE: REFERENCE NO. 1

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

February 9, 1989

Mr. Donald Comfort, P.E.
Engineering Manager
Quanex Corporation
Michigan Seamless Tube Division
400 McMunn Street
South Lyon, Michigan 48178

Dear Mr. Comfort:

Subject: Closure of Surface Impoundments
Quanex Corporation, Michigan Seamless Tube Division
MID 082 767 591

The Waste Management Division (WMD) of the Michigan Department of Natural Resources (MDNR) has reviewed the information that Quanex Corporation submitted on February 3, 1989, regarding the surface impoundments at the facility. Based on a review of the lime stabilized waste pickle liquor sludge (LSWPLS) analytical results, the WMD hereby approves the Type II waste classification for the LSWPLS. Quanex Corporation may excavate down to the soils that underlay the roughing and finishing surface impoundments only, and must dispose of the LSWPLS from the surface impoundments at a licensed Type II solid waste management facility. If you contemplate disposing of this material at a facility located outside of Oakland County, you must first contact the receiving county's Solid Waste Planning Agency to verify that disposal of out-of-county waste is allowed under the county's solid waste management plan.

The soil and sludge containing debris that is located in the impoundment berms must be left in place, pending MDNR authorization for proper disposal. Any soil and sludge containing debris that is encountered during further excavation of the LSWPLS from the roughing and finishing surface impoundments must also be left in place.

Quanex Corporation must notify Waste Management Division Detroit District staff (313-344-4670) and Lansing Hazardous Waste Permits Unit staff (517-373-2730) at least two days prior to the initiation of sludge excavation and removal.

If you have any questions, please contact Ms. Ronda L. Hall of my staff at 517-373-9548.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-2730

cc: Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Kenneth Burda, DNR/C&E File
Ms. Ronda L. Hall, DNR
Ms. Lynne King, DNR

SOURCE: REFERENCE NO. 3

x. Permit

Quanex Corporation
Michigan Seamless Tube Division
... Munn
S... ...yon, Michigan 48178
(...1...) ...37-8117

SEP 15 1989

Quanex Michigan Seamless Tube Division

September 14, 1989

Ms. Catherine Schmitt
Environmental Quality Analyst
Southeast Michigan Field Office
Surface Water Quality Division
Michigan Department of Natural Resources
505 W. Main St.
Northville, Michigan 48167

RE: Your Letter of August 22, 1989, Notice of Non-Compliance
Quanex MI 0001902

Dear Ms. Schmitt:

First of all, I apologize for my failure to submit a written explanation of our non-compliance for the incidents cited in your letter of August 22, 1989. This was due to my misconception that minor variances of one or two days out of the month did not require a written explanation.

During the month of January (which is one of the months cited in your letter) I did submit a written explanation attached to the MDR. I did so because we were consistently out of compliance for a significant period during the month and felt it required an explanation. I have attached a copy of that letter for your review.

The February 8 letter addresses the primary source of additional solids introduced to the system which periodically put us out of compliance. We try to stagger these cleanings as well as the release of spent pickle liquor in order to minimize the degree of fluctuation in solids content. Occasionally, however, operations personnel, and there are several involved, fail to regulate the tank discharge properly or sometimes production associated problems contribute to abnormally high usage of the materials contributing to the solids i.e., zinc and phosphorus and the result, unfortunately, is non-compliance. The out-of-compliance period is seldom more than one day per month and is rarely, if ever, longer than one day or more than 30 to 40% over specification as delineated below.

Violation Incidents

December, 1988

Dec. 8 Suspended solids qualitative over 21%
Dec. 19 Suspended solids quantitative over 30%

<u>January, 1989</u>

Please see attached letter dated February 8, 1989

<u>February, 1989</u>

February 13 Suspended solids qualitative over 30%
February 13 Suspended solids quantitative over 14%

<u>March, 1989</u>

March 20 Suspended solids qualitative over 37%
March 20 Suspended solids quantitative over 27%
March monthly average phosphorus qualitative over 8%

<u>May, 1989</u>

Monthly average phosphorus qualitative over 12%

<u>June, 1989</u>

Monthly average phosphorus qualitative over 20%

<u>August</u> as submitted September 8 (not included in your letter)

August 7 Suspended solids qualitative over 17%

I can certainly understand your concern over our non-compliance in view of our past record of practically never being out of compliance and I'm sure that it must appear to be flagrant disregard of our responsibility, because of our ability to be within compliance year after year. Let me assure you that this is not the case and if anything we are much more cognizant of all the factors affecting the process than ever. As you know, we were forced to abandon our impoundments in October of 1988. At this time, we installed claricones and filter presses to replace the impoundments. Previously if we were out of compliance for one day the effluent remained on our property in a 5 million gallon mixing zone, so to speak, for approximately 5 days and was well within specification before discharge. However, with our present system, it is discharged immediately. Moreover, the laboratory sample is analyzed the day after discharge which makes it impossible to correct quality problems on less than a one day cycle, with the exception, of course, of quality problems that can be determined visually. Similarly, under our previous system, we had three to four days to correct a problem within the lagoon system if necessary after receiving the lab analysis of the sample.

Another factor contributing to our qualitative problems is the fact that our volume of flow is down considerable through our new system due to capacity limitations of our clarifiers. Our process solids are the same per ton of steel produced as before so we simply have the same volume of non-captured solids being discharged in a smaller volume of water.

Ms. Catherine Schmitt
September 14, 1989
Page Three

Please let me assure you that we are doing everything possible to tighten the control over the influences upon our water quality. We are still improving our polymer system in an effort to capture more of the solids.

Hopefully the foregoing will be sufficient explanation of the permit violations cited in your letter. In the future, I will submit a letter of explanation for all incidents of non-compliance regardless of the magnitude or frequency, if you so desire.

Sincerely,

QUANEX CORPORATION
Michigan Semaless Tube Division

W. V. Merchant
Plant Engineer

cc: Mr. Roy Schrameck, District Supervisor
J. J. Yetso
C. D. Simpson
D. F. Comfort
L. E. Ledbetter
R. E. Misslitz

Attachment: Copy of letter dated February 8, 1989

SOURCE: REFERENCE NO. 6

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
WATER RESOURCES COMMISSION

IN THE MATTER OF:

Quanex Corporation

NPDES PERMIT NO: MI0001902
NNC No. NC-08-89-05-021D

NOTICE OF NONCOMPLIANCE

TO: Quanex Corporation
400 McMunn
South Lyon, Michigan 48178

Attention: Mr. W. V. Merchant, Plant Engineer

PLEASE BE ADVISED that we have sufficient information to believe that the Quanex Corporation has failed to comply with the terms and conditions of their National Pollutant Discharge Elimination System (NPDES) Permit No. MI0001902.

PURSUANT to the terms of the NPDES Permit (Part I, Section A.1 Effluent Limitations and Monitoring Requirements) the discharge from your facility, to the Yerkes Drain via Outfall 001, is limited for the following parameters:

Discharge Limitations

Effluent Characteristics	Daily Maximum	Monthly Average
Total Suspended Solids	30 mg/l 270 lbs/day	20 mg/l 110lbs/day
Total Phosphorus	--------	0.25 mg/l 2.3 lbs/day

FURTHER, PURSUANT to the terms of the aforementioned permit (Part II, Section A.1 Duty to Comply) all discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than, or at a level in excess of that authorized, shall constitute a violation of the permit.

BE ADVISED that the Quanex Corporation has had several violations of their NPDES Permit as indicated in your facility's Discharge Monitoring Reports. The violations are as follows:

VIOLATION DATE	PARAMETER	REPORTED VALUE
December 1988	Suspended Solids	39.00 mg/l 326.93 lbs/day
	Total Phosphorus	0.28 mg/l
January 1989	Suspended Solids	39.00 mg/l 292.73 lbs/day
	Total Phosphorus	0.41 mg/l
February 1989	Suspended Solids	39.00 mg/l 309.00 lbs/day
	Total Phosphorus	0.28 mg/l
March 1989	Suspended Solids	41.00 mg/l 341.94 lbs/day
	Total Phosphorus	0.27 mg/l
May 1989	Total Phosphorus	0.28 mg/l
June 1989	Total Phosphorus	0.30 mg/l

IT IS THEREFORE DIRECTED that the Quanex Corporation immediately return to compliance with the requirements of the NPDES permit.

IT IS FURTHER DIRECTED that the Quanex Corporation submit a written report to the Surface Water Quality Division District Office on or before September 18, 1989. This report must include:

1) A detailed explanation of the reason for the violations cited above.

2) An explanation of the steps that will be implemented to prevent future NPDES permit violations.

PLEASE BE ADVISED that further administrative remedies will be instituted for continued failure to comply with the terms of your NPDES permit or this notice.

WATER RESOURCES COMMISSION
DEPARTMENT OF NATURAL RESOURCES

Date Issued: August 22, 1989

Roy E. Schrameck

Roy E. Schrameck, Supervisor
Surface Water Quality Division
Northville District Office

ADDRESS FOR FURTHER CORRESPONDENCE

Catherine J. Schmitt

Catherine J. Schmitt
Environmental Quality Analyst
Surface Water Quality Division
505 W. Main Street
Northville, Michigan 48167

cc: Frank Baldwin/Val Harris, Compliance and Enforcement
File-Quanex Corporation

SOURCE: REFERENCE NO. 19

A list of constituents which were measured above the mean background level and above their detection limit during the third quarter of 1988 are listed below by well. Due to the low calculated mean background values, most of the constituents measured above their detection limits are automatically above their mean background value.

WELL NUMBER	*MEASURED CONSTITUENT*	*CONCENTRATION*
6A	*1,1-dichloroethane	42 ppb
6A	*arsenic	7.9 ppb
11A	*1,1-dichloroethane	3.7 ppb
11B	1,1-dichloroethane	3.0 ug/l
11B	arsenic	4.0 ug/l
11D	arsenic	6.3 ppb
12B	arsenic	7.1 ug/l
13B	arsenic	5.4 ug/l

Constituents with an asterisk (*) in front of them were also above the mean of the background data during the second quarter 1988 sampling. Analyses of these constituents are statistically compared to background in Attachment F of this letter, and will be discussed later. The other five constituent well pairs will be resampled three times. This sampling is currently scheduled for November 7, 1988. Data from these samples will be combined with this data from the third quarter of 1988 to statistically compare the current concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Ground Water Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the second quarter of 1988 was above the mean background concentration, and above the detection limit, and if that parameter was not compared to background data in the second quarter, then that well was sampled three times during this quarterly sampling. The three resulting samples were each analyzed for the specific detected constituent. The results of these analyses along with the data from the previous quarter are presented in Attachment D. Only the first of the three new samples is reported in the overall analytical results in Attachment B.

Attachment E includes the five statistical comparisons of the downgradient samples to the background data from well 1. The statistical test that is used checks the the null hypothesis:

SOURCE: REFERENCE NO. 20

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON D.C. 20460

AUG 24 1988

RECEIVED
AUG 25 1988
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V.

MID 082767591

Mr. Donald Comfort
Engineering Manager
Quanex Corporation
400 McMunn Street
South Lyon, Michigan 48178

Dear Mr. Comfort:

The Permits and State Programs Division has completed a review of your February 5, 1986 petitions (#0633A and #0633B) which request the exclusion of the liquid portion of your treatment plant effluent, classified as EPA Hazardous Waste No. K062. At your request, your original petition (#0633) was divided into two parts subsequent to its submittal. The K062 treatment plant effluent was made the subject of petition #0633A, and two surface impoundments containing the K062 treatment plant effluent were made the subjects of petition #0633B. Based on the evaluation of ground-water monitoring data received from State and EPA Regional authorities and collected during the Delisting Program's spot-check sampling visit (August 26, 1987) to your facility, we will recommend to the Assistant Administrator for Solid Waste and Emergency Response that both petitions be denied.

In order for EPA to grant an exclusion, the Agency must determine that a petitioned waste will not pose a significant threat to human health and the environment. We believe that assessing the potential for hazardous constituents to migrate from the waste into the environment is necessary to our determination. While we typically use models in this assessment, we believe ground-water monitoring data from an adequate well system provides important additional information regarding a petitioned waste's impact on the environment.

After reviewing ground-water monitoring results for wells that monitor the two surface impoundments, we determined that the wastes contained in the surface impoundments (i.e., the subject of petition #0633B) may be contributing to ground-water contamination. Specifically, ground-water samples collected from wells that monitor the surface impoundments contained

Von Marshall
513-449-6357

hazardous constituents at concentrations exceeding the health-based levels used in delisting decision-making[1/]. Lead, chromium, and trichloroethene were detected in EPA spot-check samples from downgradient wells at the Quanex facility, while lead, selenium, and 1,1-dichloroethane were detected in ground-water samples collected by Quanex. One ground-water sample collected by the Michigan Department of Natural Resources also documented the presence of 1,1-dichloroethane in the ground water at a downgradient well. The ground-water monitoring data of concern are presented in Enclosure I.

In addition, you have indicated that the surface impoundments received the KØ62 treatment plant effluent (i.e. the subject of petition #Ø633A). Therefore, we believe that the petitioned treatment plant effluent, which has been managed in the on-site surface impoundment, may have also contributed to the ground-water contamination documented at this facility. As such, we feel that it would be inappropriate to grant an exclusion for a waste which has been shown to have the potential to adversely affect ground water.

Based on our consideration of the ground-water monitoring data from this facility, we do not believe that this data adequately supports an exclusion, and so we will recommend to the Assistant Administrator that proposed denial decisions for these petitions be published in the Federal Register.

It is our practice to give petitioners the option of withdrawing their petitions to avoid publication of a negative finding in the Federal Register. If you prefer this option, you must send us a letter within two weeks of the date of receipt of today's correspondence, withdrawing your petitions and indicating that the petitioned wastes are considered hazardous and will be managed as such. This letter should be forwarded to:

Mr. Jim Kent
U.S. Environmental Protection Agency
Office of Solid Waste, Mailcode OS-343
4Ø1 M Street, S.W.
Washington, D.C. 2Ø46Ø

If you choose not to withdraw your petitions, we will recommend that a denial notice be published in the Federal Register.

1/ See "Docket Report on Health-based Regulatory Levels and Solubilities Used in the Evaluation of Delisting Petitions," June 8, 1988, located in the RCRA public docket.

If you have any questions regarding our decision, please contact Mr. Scott Maid of my staff at (202) 382-4783.

Sincerely,

Bruce R. Weddle, Director
Permits and State Programs Division

Enclosure

cc: Wayde Hartwick, Region V
Allen Debus, Region V
Bill Miner, Region V
Dave Slayton, MDNR
Jenny Utz, SAIC
Jim Kent, EPA HQ
Scott Maid, EPA HQ

(#0633b) -- Selected Ground-water Monitoring Data

Parameter	Health-Based Level	Well #	Concentration (mg/l)	Date Sampled
1-Dichloro-ethane	0.00038	1*	<0.002 (upgradient)	
		11A	0.006	10-17-86 (Q)
			0.003	5-18-87 (Q)
			0.0099/0.0052/0.0047**	8-18-87 (Q)
			0.0041	11-12-87 (Q)
			/0.0018/<0.0010+	2-10-88 (Q)++
		11B	0.006	10-17-86 (Q)
			0.004	3-11-87 (Q)
			0.0021/0.0022/0.0023**	5-18-87 (Q)
			0.0061	8-18-87 (Q)
			0.0053/0.0055/0.0052**	11-12-87 (Q)
			0.0040	2-10-88 (MI)
			0.0035	2-10-88 (Q)
		14A	0.0011	8-18-87 (Q)
			0.0012/0.0014/0.0011**	11-12-87 (Q)
			0.0012	2-10-88 (Q)++
		14B	0.0011	8-18-87 (Q)
Lead	0.05	1*	0.02 (upgradient)	6-20-84
		2	0.06	9-27-84 (Q)
		11A	0.11	8-26-87 (EPA)
		15A	0.22	8-26-87 (EPA)
		16A	0.14	8-26-87 (EPA)
Chromium	0.05	1*	0.005 (upgradient)	3-14-84
		15A	0.090	8-26-87 (EPA)
		16A	0.13	8-26-87 (EPA)
Selenium	0.01	1*	0.0024 (upgradient)	2-10-88 (dissolved)
		2	0.017	9-27-84 (Q)
		12A	0.010/0.011/0.011**	2-10-88 (Q)
Trichloro-ethene	0.005	1*	<0.002 (upgradient)	
		16A	0.0069	8-26-87 (EPA)

(EPA) -- EPA Delisting Spot Check Data
(MI) -- Michigan Department of Natural Resources (MDNR) Data
(Q) -- Quanex Data
* -- Maximum values from Well #1, the upgradient well, shown for comparison.
** -- Values represent results of replicate analyses.
*** -- Sample vial broke during log-in.
+ -- Average of replicate samples exceeds delisting health-based level
++ -- MDNR value <0.0010

SOURCE: REFERENCE NO. 22

ATTACHMENT B

ANALYTICAL RESULTS FROM FIRST QUARTERLY SAMPLING IN 1988

QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISION

SAMPLED ON FEBRUARY 10, 1988

(Metal analyses for monitoring well 14A and 16A sampled on 2/17/88 due to defective filter during initial sampling)

	Units	Detection Limit	Well 1	Well 11-A	Well 11-B	M.W. 11-D	M.W. 12-A	M.W. 12-B
1,1-Dichloroethane	ug/l	1	<1	**	3.5	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	2.1	4.0	6.0	<2.0	8.0
Barium	mg/l	0.1	0.31	0.47	0.32	0.34	0.15	0.27
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Selenium	ug/l	2.0	2.4	<2.0	<2.0	<2.0	10	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	1,745	1,758	1,676	859	1,212	1,550
pH (field)	standard	NA	7.32	7.57	7.42	7.43	7.66	7.41

	Units	Detection Limit	M.W. 13-A	M.W. 13-B	M.W. 14-A	M.W. 16-A	Field Blank	Trip Blank
1,1-Dichloroethane	ug/l	1	<1	<1	1.2	<1	<1	<1
Arsenic	ug/l	2.0	<2.0	5.5	6.6	<2.0	<2.0	<2.0
Barium	mg/l	0.1	0.57	0.26	0.26	0.32	<0.10	<0.10
Cadmium	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Chromium	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	mg/l	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0,05
Selenium	ug/l	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Silver	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
*Conductivity (Field)	umhos/cm	5	2,161	1,799	1,714	1,638	NA	NA
pH (field)	standard	NA	7.15	7.25	7.28	7.37	NA	NA

< - Not detected at the indicated detection limit.

NA - Not analyzed.

* - Temperature adjusted.

[illegible]

MICHIGAN DNR

FEB. 10, 1988

Quanex Corp. South Lyons MID 082 767 591

Parameter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic		<0.002	0.0034	0.004	<0.002	0.004	0.0066	<0.002
Barium		0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium		365	374	334	497	391	306	<1
Cadmium		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron		3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium		7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium		32.2	34.2	37.5	78	53	19.7	<1
Manganese		0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium		84.1	61.3	61.9	61.1	54.6	73	<1
Nickel		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc		0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Conductivity	umhos/cm	1880	1720	1680	2200	1645	1660	—
pH	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	< 2.0
	ug/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT.
HT - The recommended maximum laboratory holding time was exceeded before analysis.
See attached list for organic scan parameters and detection limits.

MDNR samples from 2/10/88 split sampling with Quanex. Samples analyzed at DNR lab.

Comparison of DNR and Company (EDI) Lab Results
Quanex Corp. - Feb. 10, 1988

		1,1 DCE	As	Ba	Cd	Cu	Cr	Pb	pH	Conduct.
		ug/l	ug/l	mg/l	mg/l	mg/l	mg/l	mg/l	SU	umhos/cm
MW-1	DNR	K1.0	K2.0	0.034	K0.02	K0.02	K0.05	K0.05	6.50	1,890
	EDI	K1.0	K2.0	0.310	K0.01	K0.01	K0.05	K0.05	7.32	1,745
MW-11A	DNR	K1.0	3.4	0.072	K0.02	K0.02	K0.05	K0.05	6.80	1,720
	EDI	*	2.1	0.470	K0.01	K0.01	K0.05	K0.05	7.57	1,758
MW-11B	DNR	4.0	4.0	0.022	K0.02	K0.02	K0.05	K0.05	6.80	1,680
	EDI	3.5	4.0	0.320	K0.01	K0.01	K0.05	K0.05	7.42	1,676
MW-13A	DNR	K1.0	K2.0	0.125	K0.02	K0.02	K0.05	K0.05	6.60	2,200
	EDI	K1.0	K2.0	0.570	K0.01	K0.01	K0.05	K0.05	7.15	2,161
MW-13B	DNR	K1.0	4.0	0.026	K0.02	K0.02	K0.05	K0.05	6.80	1,645
	EDI	K1.0	5.5	0.260	K0.01	K0.01	K0.05	K0.05	7.25	1,799
MW-14A	DNR	K1.0	6.6	0.118	K0.02	K0.02	K0.05	K0.05	6.60	1,660
	EDI	1.2	6.6	0.260	K0.01	K0.01	K0.05	K0.05	7.28	1,714

K - less than

* - sample vial broken upon log-in

SOURCE: REFERENCE NO. 26

9/15/80

SCAN 1 - PURGEABLE HALOCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Vinyl chloride	5.0
Bromomethane*	5.0
Chloroethane*	5.0
Trichlorofluoromethane*	5.0
1,1-Dichloroethene	1.0
Methylene chloride*	5.0
trans-1,2-Dichloroethene	1.0
1,1-Dichloroethane*	1.0
cis-1,2-Dichloroethene	1.0
Chloroform*	1.0
1,1,1-Trichloroethane*	1.0
Carbon tetrachloride*	1.0
1,2-Dichloroethane*	1.0
Trichloroethene	1.0
1,2-Dichloropropane*	1.0
Bromodichloromethane*	1.0
cis-1,3-Dichloropropene	1.0
trans-1,3-Dichloropropene	1.0
1,1,2-Trichloroethane*	1.0
Tetrachloroethene	1.0
Dibromochloromethane*	1.0
Chlorobenzene	5.0
Bromoform*	1.0
1,1,2,2-Tetrachloromethane*	1.0

* Compound not confirmed by second independent technique.

SCAN 2 - PURGEABLE AROMATIC HYDROCARBONS

COMPOUND	DETECTION LIMIT (ug/l)
Benzene	1.0
Toluene	1.0
Ethylbenzene	1.0
Xylene isomers	1.0

Quanex Corp. South Lyons MID 082 767 591

P[illegible]eter	mg/l unless noted	MW1	MW11A	MW11B	MW13A	MW13B	MW14A	Field Blank
Alkalinity		103	136	120	308	142	350	<5.0
Carbonate Alk		<5	<5	<5	<5	<5	<5	<5
Bicarbonate Alk		103	136	120	308	142	350	<5
Chloride		47	74	78	44	50	170	<1.0
Arsenic	dissolved	<0.002	0.0034	0.004	<0.002	0.004	0.0066	<0.002
Barium	dissolved	0.034	0.072	0.022	0.125	0.026	0.118	<0.01
Calcium	dissolved	365	374	334	497	391	306	<1
Cadmium	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Chromium	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Copper	dissolved	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Iron	dissolved	3.3	5.95	3.1	3.5	6.35	12.5	<0.1
Potassium	dissolved	7.6	10.6	5.14	2.45	5.2	3.4	<0.1
Magnesium	dissolved	32.2	34.2	37.5	78	53	19.7	<1
Manganese	dissolved	0.995	0.885	0.45	0.9	0.36	0.17	<0.02
Sodium	dissolved	84.1	61.3	61.9	61.1	54.6	73	<1
Nickel	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Lead	dissolved	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Zinc	dissolved	0.97	<0.05	<0.05	<0.05	<0.05	0.48	<0.05
Conductivity	umhos/cm	1880	1720	1680	2200	1645	1660	—
field pH	su	6.5	6.8	6.8	6.6	6.8	6.6	—
Sulfate		1070	910	818	1120	1050	330	< 2.0
	ug/l							
1,1 Dichloroethane		<1.0	<1.0	4.0	<1.0	<1.0	<1.0	<1.0
Others in Scan 1 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection
Toluene		<1.0	<1.0	1.1 UC	<1.0	<1.0	<1.0	<1.0
Others in Scan 2 *		<detection	<detection	<detection	<detection	<detection	<detection	<detection

* All volatile organic scan data coded HT.
HT - The recommended maximum laboratory holding time was exceeded before analysis.
See attached list for organic scan parameters and detection limits.

[illegible]
[illegible] LABORATORY

REPORT Waste Management Division
TO [illegible] Building
Lansing, MI [illegible]

ATTN [illegible]

LABORATORY WORK ORDER # [illegible]
[illegible]
[illegible]
RECEIVED [illegible] CLIENT [illegible]
REPORTED ______ NUMBER OF SAMPLES [illegible]
LAB CONTACT [illegible] MATRIX WATER

TEST / UNITS	MW 1	MW 11A	MW 11B	MW 13A
Alkalinity of Water (mg CaCO3/l)	103	136	120	308
Carbonate Alkalinity (mg CaCO3/l)	K 5	K 5	K 5	K 5
Bicarbonate Alkalinity (mg CaCO3/l)	103	136	120	308
Chloride in Water (mg/l)	47	74	78	44
Arsenic - Dissolved (ug/l (Diss))	K 2.0	3.4	4.0	K 2.0
Barium - Dissolved (ug/l (Diss))	34.0	72.0	22.0	125
Calcium - Dissolved (mg/l (Diss))	365	374	334	497
Cadmium - Dissolved (ug/l (Diss))	K 20	K 20	K 20	K 20
Chromium - Dissolved (ug/l (Diss))	K 50	K 50	K 50	K 50
Copper - Dissolved (ug/l (Diss))	K 20	K 20	K 20	K 20
Iron - Dissolved (ug/l (Diss))	3300	5950	3100	3500
Potassium - Dissolved (mg/l (Diss))	7.6	10.6	5.14	2.45
Magnesium - Dissolved (mg/l (Diss))	32.2	34.2	37.5	78
Manganese - Dissolved (ug/l (Diss))	995	885	450	900
Sodium - Dissolved (mg/l (Diss))	84.1	61.3	61.9	61.1
Nickel - Dissolved (ug/l (Diss))	K 50	K 50	K 50	K 50
Lead - Dissolved (ug/l (Diss))	K 50	K 50	K 50	K 50
Zinc - Dissolved (ug/l (Diss))	970	K 50	K 50	K 50
FIELD - Conductivity (umho/cm)	1980	1720	1680	2200

TEST	MW 9	MW 11A	MW 11B	MW 12A
FIELD - pH of Water (pH)	5.5	6.8	6.3	5.6
.fate in Water (mg/l)	1070	910	818	1120

TEST	MW 12B	MW 14A	FIELD BLANK
Alkalinity of Water (mg CaCO3/l)	142	350	K 5.0
Carbonate Alkalinity (mg CaCO3/l)	K 5	K 5	K 5
Bicarbonate Alkalinity (mg CaCO3/l)	142	350	K 5
Chloride in Water (mg/l)	50	170	K 1.0
Arsenic - Dissolved (ug/l (Diss))	4.0	6.6	K 2.0
Barium - Dissolved (ug/l (Diss))	26.0	118	K 10.0
Calcium - Dissolved (mg/l (Diss))	391	306	K 1
Cadmium - Dissolved (ug/l (Diss))	K 20	K 20	K 20
Chromium - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Copper - Dissolved (ug/l (Diss))	K 20	K 20	K 20
Iron - Dissolved (ug/l (Diss))	6350	12500	K 100
Potassium - Dissolved (mg/l (Diss))	5.2	3.4	K .1
Magnesium - Dissolved (mg/l (Diss))	53	19.7	K 1
Manganese - Dissolved (ug/l (Diss))	360	170	K 20
Sodium - Dissolved (mg/l (Diss))	54.6	73	K 1
Nickel - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Lead - Dissolved (ug/l (Diss))	K 50	K 50	K 50
Zinc - Dissolved (ug/l (Diss))	K 50	480	K 50
FIELD - Conductivity (umho/cm)	1645	1650	
FIELD - pH of Water (pH)	6.8	6.6	
Sulfate in Water (mg/l)	1050	330	K 2.0

Report approved By: D Harlig 4-14-88

Page 3 DVR Laboratory REPORT Work Order # 89-02-041
Received: 02/11/89 Results by Sample

SAMPLE ID MW 1 FRACTION 01A TEST CODE 601 NAME Scan 1 Water
Date & Time Collected 02/10/89 11:45:00 Category

ANALYST KAJIYA
ANALYZED 03/01/89
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/88

DWR Laboratory REPORT

Results by Sample

Work Order # 88-02-041

SAMPLE ID MW 1 FRACTION 01A TEST CODE 8D_C NAME Scan 0 Water

Date & Time Collected 02/10/88 11:45:00 Category

ANALYST KAJIYA

ANALYZED 03/01/88

DILUTION 1

UNITS ug/L ppb

CAS	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
[illegible]	Xylene [illegible]	ND		1.0

COMMENTS BY

ND = not detected at the specified detection limit.

DNR Laboratory REPORT Work Order # 88-12-041
Results by Sample

FRACTION 02A TEST CODE 601 NAME Scan 1 Water
Date & Time Collected 02/10/88 13:15:00 Category

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
01-4	Vinyl chloride	ND		5.0
83-9	*Bromomethane	ND		5.0
00-3	*Chloroethane	ND		5.0
69-4	*Trichlorofluoromethane	ND		5.0
35-4	1,1-Dichloroethene	ND		1.0
09-2	*Methylene chloride	ND		5.0
60-5	trans-1,2-Dichloroethene	ND		1.0
34-3	*1,1-Dichloroethane	ND		1.0
59-2	cis-1,2-Dichloroethene	ND		1.0
66-3	*Chloroform	ND		1.0
55-6	*1,1,1-Trichloroethane	ND		1.0
23-5	*Carbon tetrachloride	ND		1.0
06-2	*1,2-Dichloroethane	ND		1.0
01-6	Trichloroethene	ND		1.0
87-5	*1,2-Dichloropropane	ND		1.0
27-4	*Bromodichloromethane	ND		1.0
01-5	cis-1,3-Dichloropropene	ND		1.0
02-6	trans-1,3-Dichloropropene	ND		1.0
00-5	*1,1,2-Trichloroethane	ND		1.0
18-4	Tetrachloroethene	ND		1.0
48-1	*Dibromochloromethane	ND		1.0
90-7	Chlorobenzene	ND		5.0
25-2	*Bromoform	ND		1.0
34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENT NT

ND = not detected at the specified detection limit.
*Compound identity not confirmed by second independent technique.

Received: 02/11/88

DNR Laboratory REPORT
Results by Sample

Work Order # 88-02-041

SAMPLE ID MW 11A FRACTION 02A TEST CODE 8D [illegible] NAME [illegible] Water
Date & Time Collected 02/10/88 13:25:00 CATEGORY

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethane	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/89 Results by Sample

SAMPLE ID MW 11A FRACTION 02A TEST CODE 8020 NAME Scan 2 Water
Date & Time Collected 02/10/89 13:25:00 Category

BY KAJIYA
ANALYZED 03/01/89
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
1330-20-7	Xylene isomers	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

Received: 02/11/88

DNR Laboratory REPORT
Results by Sample

Work Order # 88-02-041

SAMPLE ID MW 113

PROJECT 02A TEST CODE 8D.1 [illegible] E Scan / Water
Date & Time Collected 02/10/88 13:35:00 [illegible]

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	4.0		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/88 Results by Sample

[illegible] 88 442 STATION 02A TEST CODE SC 2 NAME Scan 2 Water
Date & Time Collected 02/10/88 11:35:00 Category

[illegible] KAGIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	Benzene	ND		1.0
[illegible]	Toluene	1.1	UC	1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene isomers	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

Received: 02/11/88

DWR Laboratory REPORT Work Order # 88-02-041
Results by Sample

SAMPLE ID MW 12A FRACTION 04A TEST CODE 601 NAME Scan 1 Water
Date & Time Collected 02/10/88 12:30:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit
* Compound identity not confirmed by second independent technique.

Received: [illegible] Results by Sample

SAMPLE ID [illegible] FRACTION 04A TEST CODE [illegible] NAME [illegible] Water
Date & Time Collected [illegible] Category

TEST [illegible]
ANALYZED [illegible]
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
[illegible]	Xylene Isomers	ND		1.0

COMMENTS [illegible]

ND = not detected at the specified detection limit.

Received: 02/11/98

DWR Laboratory REPORT
Results by Sample

Work Order # 98-02-041

SAMPLE ID MW 133

PROGRAM QSA TEST CODE 8D 1 NAME Soap 1 Water

Date & Time Collected 02/10/98 12:35:00 Category

ANALYST KAJIYA
ANALYZED 03/01/98
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/93 Results by Sample

SAMPLE ID MW 17B FRACTION 05A TEST CODE 8020 NAME Scan 2 Water

Date & Time Collected 02/10/93 12:35:00 Category

ANALYST KAGIYA

ANALYZED 03/01/93

DILUTION 1

UNITS ug/L ppb

CAS	COMPOUND	RESULT	REMARK	DETECTION LIMIT
[illegible]	Benzene	ND		1.0
[illegible]	Toluene	ND		1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene Isomers	ND		1.0

COMMENT HT

ND = not detected at the specified detection limit.

Received: 02/11/88

Results by Sample

SAMPLE ID MW 144 FRACTION 04A TEST CODE SC 1 NAME Scan 1 Water

Date & Time Collected 02/10/88 12:55:00 Category

ANALYST KAJIYA

ANALYZED 03/01/88

DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS HT

ND = not detected at the specified detection limit.

* Compound identity not confirmed by second independent technique.

 DNR Laboratory REPORT Work Order # 88-02-041
Received: 02/11/88 Results by Sample

Sample ID MW 14A FRACTION 06A TEST CODE 8D 2 NAME Scan 2 Water
Date & Time Collected 02/10/88 10:55:00 Category

ANALYST KA[illegible]YA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
100-41-4	Ethylbenzene	ND		1.0
106-[illegible]	Xylene isomers	ND		1.0

COMMENTS NT

ND = not detected at the specified detection limit.

Received: 02/11/88

DWR Laboratory REPORT
Results by Sample

Work Order # 88-02-041

SAMPLE ID FIELD BLANK

STATION 07A TEST CODE SC 1 NAME Scan 1 Water
Date & Time Collected 02/10/88 13:40:00 Category

ANALYST KAJIYA
ANALYZED 03/01/88
DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
75-01-4	Vinyl chloride	ND		5.0
74-83-9	*Bromomethane	ND		5.0
75-00-3	*Chloroethane	ND		5.0
75-69-4	*Trichlorofluoromethane	ND		5.0
75-35-4	1,1-Dichloroethene	ND		1.0
75-09-2	*Methylene chloride	ND		5.0
156-60-5	trans-1,2-Dichloroethene	ND		1.0
75-34-3	*1,1-Dichloroethane	ND		1.0
156-59-2	cis-1,2-Dichloroethene	ND		1.0
67-66-3	*Chloroform	ND		1.0
71-55-6	*1,1,1-Trichloroethane	ND		1.0
56-23-5	*Carbon tetrachloride	ND		1.0
107-06-2	*1,2-Dichloroethane	ND		1.0
79-01-6	Trichloroethene	ND		1.0
78-87-5	*1,2-Dichloropropane	ND		1.0
75-27-4	*Bromodichloromethane	ND		1.0
10061-01-5	cis-1,3-Dichloropropene	ND		1.0
10061-02-6	trans-1,3-Dichloropropene	ND		1.0
79-00-5	*1,1,2-Trichloroethane	ND		1.0
127-18-4	Tetrachloroethene	ND		1.0
124-48-1	*Dibromochloromethane	ND		1.0
108-90-7	Chlorobenzene	ND		5.0
75-25-2	*Bromoform	ND		1.0
79-34-5	*1,1,2,2-Tetrachloroethane	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.
* Compound identity not confirmed by second independent technique.

Received: 02/11/98

Results by Sample

SAMPLE ID FIELD BLANK FRACTION 07A TEST CODE 8020 NAME Scan C Water

Date & Time Collected 02/10/98 13:40:00 Category ______

TEST KAJIYA

ANALYZED 03/01/98

DILUTION 1

UNITS ug/L ppb

CAS#	COMPOUND	RESULT	REMARK	DETECTION LIMIT
71-43-2	Benzene	ND		1.0
108-88-3	Toluene	ND		1.0
[illegible]	Ethylbenzene	ND		1.0
[illegible]	Xylene Isomers	ND		1.0

COMMENTS LAB WATER BLANK

ND = not detected at the specified detection limit.

Page 1 of 2

EL 070
4/87
RIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected
SAFETY WARNING
YES / NO -- INFO ON BACK

LAB ORDER# 8802-241 PROJ CODE ____ PRIORITY II RECEIVED AT LAB BY JW DATE TIME 2/11/88 9:45 AM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517) - 373-2730

LOCATION SAMPLED Quanex, South Lyons COLLECTED BY Browne/Slayton TRANS TO ____

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD - HW Permits S. Ottowa Tower Lansing

SAMPLE REMARKS please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION pH	spec cond
01	MW1	880210	1145	6.5	1880
02	MW11A	880210	1325	6.8	1720
03	MW 11B	880210	1335	6.8	1680
04	MW 13A	880210	1230	6.6	2200
05	MW 13B	880210	1235	6.8	1645

GENERAL CHEMISTRY

J	DO	Diss Oxygen	1 2 3 4 5
K	GN	o-Phos NO2-	1 2 3 4 5 GN1
		Residue SS	1 2 3 4 5
		Residue TDS	1 2 3 4 5
		....	1 2 3 4 5
		BOD Tot 5 day	1 2 3 4 5
		BOD Carb 5 day	1 2 3 4 5
		....	1 2 3 4 5
L	GA	COD	1 2 3 4 5
		TOC	1 2 3 4 5
		NO3+NO2, NH3	1 2 3 4 5 GA2
		KJEL N, Tot P	1 2 3 4 5
		....	1 2 3 4 5
M	GG	Phenolics	1.2.3.4.5
N	9	Total CN	1.2.3.4.5
		Free CN	1.2.3.4.5
P	BC	Fecal Coli	1.2.3.4.5
		Total Coli	1.2.3.4.5
O	CA	Chlorophyll	1.2.3.4.5

ORGANICS

R	PO1	#1 Halocarbons	1 2 3 4 5
	PG2	#2 Aromatic HC	1 2 3 4 5
		....	1 2 3 4 5
S	ON	#3 Chloro HC + Pest & PCB	1 2 3 4 5
		....	1 2 3 4 5
T	OB	GC/MS Base Neut	1 2 3 4 5
		....	1 2 3 4 5
U	OA	#8 Phenols	1 2 3 4 5
		....	1 2 3 4 5
V	OG	Oil & Grease	1 2 3 4 5

**** SPECIAL REQUESTS ****

.... 1 2 3 4 5 (8 lines)

INORGANIC

X	MA	Total Metals	1 2 3 4 5
	MAD	Diss-Field Filtered	1 2 3 4 5
	MD	Diss-Lab Filtered	1 2 3 4 5
		Ca Mg Na K	1 2 3 4 5 MA1
		Cd Cr Cu Ni Pb Zn	1 2 3 4 5 MA2
		Fe Co Li Mn	1 2 3 4 5 MA3
		Al Ba Be Mo Ti V	1 2 3 4 5 MA4
		....	1 2 3 4 5
		Hg - Mercury	1 2 3 4 5
		As - Arsenic	1 2 3 4 5
		Se - Selenium	1 2 3 4 5
		Sb - Antimony	1 2 3 4 5
		....	1 2 3 4 5
		LOW LEVEL Ag	1 2 3 4 5
		" " Cd	1 2 3 4 5
		" " Cr Cu Ni Pb	1 2 3 4 5 MF1
		....	1 2 3 4 5
Y	MN	pH, Conductance	1 2 3 4 5 MN1
		Cl, SO4, Total Alk	1 2 3 4 5 MN2
		HCO3- CO3=	1 2 3 4 5 MN3
		Cr+6	1 2 3 4 5
		Fluoride	1 2 3 4 5
		....	1 2 3 4 5

Page 2 of 2

EL 070
4/87
MATRIX = WATER

MICHIGAN DEPT OF NATURAL RESOURCES
ENVIRONMENTAL LABORATORY
ANALYSIS REQUEST SHEET

Not Expected
SAFETY WARNING
YES / NO - INFO ON BACK

ORDER# 8802-041 PROJ CODE ____ PRIORITY II RECEIVED AT LAB BY N21 DATE TIME 2/11/88 9:45 AM PM

SUBMITTER DIVISION WMD DISTRICT OR OFFICE HW Permits CONTACT PERSON FOR QUESTIONS Liz Browne PHONE (517)-373-2730

LOCATION SAMPLED Quanex South Lyons COLLECTED BY Browne/Slayton TRANS TO ____

COST CENTER 90026 SEND RESULTS TO ATTENTION OF Liz Browne AT ADDRESS (if different than above office) WMD-HW Permits S. Ottowa Tower Lansing

SAMPLE REMARKS Please enter field data on to SAM

SAMPLE NUMBER	FIELD ID OR DESCRIPTION	SAMPLE COLLECTED YY/MM/DD	HH:MM	SAMPLE INFORMATION pH	Spec cond.
06	MW 14A	880210	1255	6.6	1660
07	FB Field Blank	880210	1340	—	—
03					
04					
05					

GENERAL CHEMISTRY

DO	Diss Oxygen ...	1 2 3 4 5	J
GN	o-Phos NO2- ...	1 2 3 4 5	GN1
	Residue SS	1 2 3 4 5	
	Residue TDS ...	1 2 3 4 5	
	....	1 2 3 4 5	
	BOD Tot 5 day	1 2 3 4 5	
	BOD Carb 5 day	1 2 3 4 5	
	....	1 2 3 4 5	K
GA	COD	1 2 3 4 5	L
	TOC	1 2 3 4 5	
	NO3+NO2, NH3 ..	1 2 3 4 5	GA2
	KJEL N, Tot P .	1 2 3 4 5	
	....	1 2 3 4 5	
GG	Phenolics	1.2.3.4.5	M
GB	Total CN	1.2.3.4.5	N
	Free CN	1.2.3.4.5	
BC	Fecal Coli	1.2.3.4.5	P
	Total Coli	1.2.3.4.5	
CA	Chlorophyll	1.2.3.4.5	O

ORGANICS

PO1	#1 Halocarbons	1 2 3 4 5	R
PO2	#2 Aromatic HC	1 2 3 4 5	
	....	1 2 3 4 5	
ON	#3 Chloro HC + Pest & PCB .	1 2 3 4 5	S
	....	1 2 3 4 5	
OB	GC/MS Base Neut	1 2 3 4 5	T
	....	1 2 3 4 5	
OA	#8 Phenols	1 2 3 4 5	U
	....	1 2 3 4 5	
OG	Oil & Grease ..	1 2 3 4 5	V

* * * * SPECIAL REQUESTS * * * *

.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5
.... 1 2 3 4 5

INORGANIC

MA	Total Metals	1 2 3 4 5	X
MAD	Diss-Field Filtered ...	1 2 3 4 5	
MD	Diss-Lab Filtered	1 2 3 4 5	
	Ca Mg Na K	1 2 3 4 5	MA1
	Cd Cr Cu Ni Pb Zn	1 2 3 4 5	MA2
	Fe Co Li Mn	1 2 3 4 5	MA3
	Al Ba Be Mo Ti V	1 2 3 4 5	MA4
	....	1 2 3 4 5	
	Hg - Mercury	1 2 3 4 5	
	As - Arsenic	1 2 3 4 5	
	Se - Selenium	1 2 3 4 5	
	Sb - Antimony	1 2 3 4 5	
	....	1 2 3 4 5	
	LOW LEVEL Ag	1 2 3 4 5	
	" " Cd	1 2 3 4 5	
	" " Cr Cu Ni Pb ..	1 2 3 4 5	MF1
	....	1 2 3 4 5	
MN	pH, Conductance	1 2 3 4 5	MN1
	Cl, SO4, Total Alk ...	1 2 3 4 5	MN2
	HCO3- CO3=	1 2 3 4 5	MN3
	CR+6	1 2 3 4 5	
	Fluoride	1 2 3 4 5	
	....	1 2 3 4 5	

SOURCE: REFERENCE NO. 27

upgradient well 1 are summarized in Attachment C.

A list of constituents which were measured above the mean background level and above their detection limit for the first quarter of 1988 are listed below by well. Due to the low calculated mean background values, most of the constituents measured above their detection limits are automatically above their mean background value.

WELL NUMBER	*CONSTITUENT*	*MEASURED CONCENTRATION*
11A	*1,1-dichloroethane	1.8 **
11A	arsenic	2.1 ppb
11A	barium	470 ppb
11B	1,1-dichloroethane	3.5 ppb
11B	arsenic	4.0 pbb
11D	arsenic	6.0 ppb
12A	*selenium	10 ppb
12B	arsenic	8.0 ppb
13A	barium	570 ppb
13B	arsenic	5.5 ppb
14A	1,1-dichloroethane	1.2 ppb
14A	arsenic	6.6 ppb

** *Duplicate sample recorded. Original sample vial broken upon log-in.*

Constituents with an asterisk (*) in front of them were also above the detection limits during the fourth quarter 1987 sampling. Analyses of these constituents are statistically compared to background in Attachment F, and will be discussed later. The other ten constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the second quarter sampling, 1988. Data from these samples will be combined with the data from this first quarter, 1988, to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the fourth quarter of 1987 was above the mean background concentration, and above the detection limit, then that well was

SOURCE: REFERENCE NO. 32

WELL NUMBER	CONSTITUENT	MEASURED CONCENTRATION
11A	1,1-dichloroethane	4.1 ppb
11B	*1,1-dichloroethane	5.3 ppb
	*arsenic	3.7 ppb
11D	*arsenic	4.6 ppb
12A	copper	10.0 ppb
	selenium	2.9 ppb
12B	*arsenic	9.2 ppb
13B	*arsenic	5.6 ppb
14A	*1,1-dichloroethane	1.2 ppb
	*arsenic	8.4 ppb
16A	copper	30.0 ppb

Constituents with an asterisk (*) in front of them were also above the detection limits during the third quarterly sampling. Analyses of these constituents are statistically compared to background in Attachment E, and will be discussed later. The other four constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the first quarter sampling, 1988. Data from these samples will be combined with the data from the fourth quarter, 1987, to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program dated April, 1986, revised July, 1986.

If the concentration of a constituent in a well measured during the third quarter of 1987 was above the mean background concentration, and above the detection limit, then that well was purged and sampled three times during this quarterly sampling. The three resulting samples were each analyzed for the specific detected constituent. The results of these analyses along with the data from the third quarter are presented in Attachment D. Only the first of the three new samples is reported in the overall analytical results in Attachment B.

Attachment E statistically compares these seven downgradient samples to the background data from well 1. The statistical test which was used tests the null hypothesis:

H_o: The concentration of the constituent in the downgradient well is not greater than the concentration in the background, upgradient well.

versus the alternate hypothesis:

H_1: The concentration of the constituent in the downgradient well is greater than the concentration in the background, upgradient well.

When the statistical test indicates that we can reject H_o with a confidence level of 99%, then we accept H_1. (NOTE: This test assumes a normally distributed population.) The decision to accept or reject H_o is documented in Attachment E and is summarized below.

SOURCE: REFERENCE NO. 35

u. iex Corporation
)C .AcMunn
outh Lyon, Michigan 48178
1" 437-1715

Quanex

January 4, 1988

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Groundwater Quality Division
15500 Sheldon Road
Northville, Michigan 48167

Attn: Mr. Harim Shakir

Dear Sir,

This letter will confirm the action taken for the months of July, 1987 through December, 1987, in compliance with the bi-yearly report of the Continuing Recovery of Oil from the ground.

SUMMARY OF JULY THRU DECEMBER INCIDENT TO DATE DATA

Total Gallons of Fuel Oil Recovered	Total Gallons of Fuel Oil Recovered to December 30, 1987
10	289,638

The well monitoring observation is still being conducted on a bi-monthly schedule.

Sincerely,
QUANEX CORPORATION
Michigan Seamless Tube Division

C. D. Simpson
Chief Engineer

CDS:st
cc: J.J. Yetso
W.V. Merchant
D.F. Comfort

SOURCE: REFERENCE NO. 36

SITE DESCRIPTION/EXECUTIVE SUMMARY

Site Name and Location

Quanex Corporation
400 McMunn
South Lyon, MI 48178

County: Oakland
Michigan Code Number: 63-01N-07E-30AC
DNR District: Detroit
EPA ID Number: MID082767591

SAS Score/Screen No.: 06

The Quanex Corporation site experienced a loss of 420,000 gallons of fuel oil in 1974. A field investigation from the Michigan Water Resources Commission noted an accumulation of oil in the Yerkes Drain and in wetlands at the southwest corner of the site on March 9, 1974. A remedial action plan was implemented involving the use of recovery pits, an interceptor drain, and recovery booms in the Yerkes Drain. As of May 31, 1985, 289,513 gallons of fuel were recovered. The MDNR District Office in Northville has records of test results from monitor well sampling. City of South Lyon municipal wells are approximately ¼ mile from the spill site, but no contamination has been detected. MDNR groundwater information indicates that groundwater flow is to the south-southwest, directly into the Yerkes Drain. At present, only trace levels of fuel are reclaimed in the recovery system.

Recommendations for EPA

This site receives a low priority for inspection as petroleum products are not CERCLA regulated hazardous substances.

Pre-HRS Score: N/A
Projected HRS Score: N/A
SI Priority: Low
Hours Spent: 6 hrs + 1.0 + ______ + ______ + ______ = ______
Initial & Date: PL 11/10/87 SC 11-10-87 ______ ______ ______

Date of Previous Summary: 12/2/85
Previous Author: N. Rottschafer

Current Date: 11/10/87
Author: D. Courtney

Site Assessment Unit
Environmental Response Division
Michigan Dept. of Natural Resources

SOURCE: REFERENCE NO. 38

A list of constituents which were measured above the mean background level and above their detection limit for the third quarter are listed below by well. Due to the low calculated mean background values, any constituent measured above its detection limit is automatically above the mean background value.

WELL NUMBER	*CONSTITUENT*	*DETECTION LIMIT*
11A	1,1-dichloroethane	9.9 ppb
11B	1,1-dichloroethane	6.1 ppb
	arsenic	4.9 ppb
11D	arsenic	5.9 ppb
12B	arsenic	9.4 ppb
13B	arsenic	5.9 ppb
14A	1,1-dichloroethane	1.1 ppb
	arsenic	8.6 ppb

With the exception of well 11A, which is statistically analyzed in this letter, all of the above constituents will be resampled three times with purging in between. The resampling for the above-mentioned constituents will occur concurrently with the fourth quarter sampling for this project which is scheduled for mid-November. Data from these samples will be combined with the data from this third quarter to statistically compare the concentrations to background data using the t-Test with the continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program.

The four constituent well pairs that were sampled three times in the third quarter are presented in Attachment D. Attachment E statistically compares these four downgradient samples to the background data from well 1. The statistical test which was used tests the null hypothesis:

> H_O: The concentration of the constituent in the downgradient well is less than or equal to the concentration in the background, upgradient well.

versus the alternate hypothesis:

> H_1: The concentration of the constituent in the downgradient well is greater than the concentration in the background, upgradient well.

When the statistical test indicates that we can reject H_O with a confidence level of 99%, then we accept H_1. (NOTE: This test assumes a normally distributed population.) The decision to accept or reject H_O is documented in Attachment E and is summarized below.

WELL NUMBER	*PARAMETER*	*DECISION*
11A	1,1-dichloroethane	do not reject H_O
11A	barium	do not reject H_O
11D	barium	do not reject H_O
12A	barium	do not reject H_O

SOURCE: REFERENCE NO. 46

quarter are presented in Attachment D. It should be noted that the first of the three new samples is the same sample that is presented for the second quarter sampling in Attachment B.

During the first 1987 quarterly sampling, the distilled water used for decontamination was carried to the site in a steel drum. This resulted in the contamination of the distilled water with small amounts of cadmium and copper, and may have contaminated the first quarter sample from well 11D with cadmium. During the second 1987 quarterly sampling, all distilled water was transported to the site in plastic containers. None of the measured constituents were detected in the field blank collected during this sampling. During the remaining sampling periods, distilled water will always be carried to the field in plastic containers.

A list of constituents which were measured above the mean background level and above their detection limit are listed below by well. Due to the low calculated mean background values, any constituent measured above its detection limit is automatically above the mean background value.

WELL NUMBER	*CONSTITUENT*	*DETECTION LIMIT*
11A	1,1-dichloroethane	3.0 ppb
	barium	0.20 ppm
11B	*1,1-dichloroethane	2.1 ppb
	*arsenic	2.4 ppb
11D	*arsenic	5.3 ppb
	barium	0.13 ppm
12A	barium	0.18 ppm
12B	*arsenic	9.3 ppm
13B	*arsenic	7.6 ppb
14A	*arsenic	8.7 ppb

Constituents with an asterisk (*) in front of them were also above the detection limits during the first quarterly sampling. Analyses of these constituents are statistically compared to background in Attachment E, and will be discussed later. The other four constituent well pairs will be resampled three times, with purging between sampling. This sampling will occur concurrently with the third quarterly sampling for this project which is scheduled for mid-August. Data from these samples will be combined with the data from this quarter to statistically compare the concentrations to background data using the t-test with continuity correction. This statistical test is described in Section 6.2 of the Groundwater Quality Assessment Program.

The concentrations of detected constituents (listed above) are very low. 1,1-Dichloroethane was not detected above 3 ppb, and the concentrations of arsenic and barium are all five times lower than the maximum concentration of constituents for groundwater protection given in 40 CFR 264.94, Table 1.

SOURCE: REFERENCE NO. 47

611 Cascade West Parkway, SE • Grand Rapids, Michigan 49506-2179 • (616) 942-9600

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WASTE MANAGEMENT DIV.

MAY 22 1987

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EDI Engineering & Science

Environmental Engineering
Geology, Biology and Chemistry

ORIG - C+E
XC - District Det. WMD
XC - Geotech Un.

A copy for your files if you don't have one.
Dave Slayton

May 21, 1987

Mr. Dave Slayton
Michigan Department of Natural Resources
Waste Management Division
P O Box 30028
Lansing, MI 48909

Groundwater Files

RE: QUANEX CORPORATION, MICHIGAN SEAMLESS TUBE DIVISION
EPA NO. MID082-767-591
1986 ANNUAL REPORT

Dear Dave:

Due to the extended period of time required to gain approval of the current Groundwater Quality Assessment Plan, only the extensive "initial sampling" was performed during 1986. This letter summarizes the development of this document and summarizes the information gathered during 1986. To place the events of 1986 in context, the following discussion begins in the end of 1985.

At the end of 1985, the facility referenced above was operating under a revised Groundwater Quality Assessment Plan (GQAP) developed by Keck Consulting Services which was submitted to the EPA on October 25, 1985. In Step 1 of this plan, monitoring wells 1 through 4 were sampled and analyzed for metals and volatile organics. The results of these analyses were submitted to EPA in a letter from Don Comfort, Quanex Corporation, dated December 18, 1985. Methylene chloride was detected in all four samples, so the four wells were resampled on December 23, 1985 (Step 2), and the results from these analyses were sent to the EPA in a letter from Mr. Comfort dated January 22, 1986.

Step 3 of the October, 1985 GQAP consisted of the installation and testing of additional monitoring wells for the parameters detected in Steps 1 and 2. This step was designed to help identify the source and extent of any groundwater contamination and to further define the hydrogeology beneath the site. Since additional monitoring wells had already been installed and a more detailed hydrogeologic report had been written for the Part B permit application, it was determined that the October, 1985 GQAP would be revised to reflect the present situation. In a phone call on January 20, 1986 between Jim Tolbert, EDI and Margo Dilday, EPA, Ms. Dilday agreed that the EPA would review the Quanex hydrogeologic report and would then discuss the revisions to the GQAP. On January 22, 1986 a copy of the hydrogeologic report on the facility was sent to Ms. Dilday by Mr. Tolbert.

On February 13, 1986 Joe Baker, EPA, called Mr. Tolbert with the EPA's concerns on the revisions to the GQAP. In this phone call, Mr. Tolbert indicated that the revised GQAP would be in the mail the week of February 24, and on Friday, February 28 the February, 1986 revision of the GQAP was sent to Ms. Dilday.

On March 5, 1986 Mr. Tolbert called Ms. Dilday to confirm the arrival of the revised GQAP. On March 28, Mr. Baker called Mr. Tolbert with additional changes to be made to the February, 1986 revision of the GQAP. These changes were made and the April, 1986 revision of the GQAP was sent to Mr. Baker on April 14.

At the end of May, 1986, Mr. Baker called Mr. Tolbert with additional changes which were required, and these revisions were mailed to the EPA on July 31. This package contained only the pages affected by the July, 1986 revisions which were to be inserted into the April revision of the GQAP.

This GQAP was approved contingent upon one additional change by William Muno, EPA, in a letter to Mr. Comfort, dated September 4, 1986. This change was submitted in a letter to Mr. Baker from Mr. Tolbert dated October 10, 1986, as a single page to be replaced in the revised April, 1986 GQAP. Then, the initial sampling under this program was performed on October 15 through 17.

The results from this sampling event were reported in a letter to Mr. Baker dated December 4, 1986. These analyses did not detect methylene chloride in any of the 20 wells sampled, or in the trip blank. Since methylene chloride was not detected in any of these wells, and since methylene chloride is a common laboratory contaminant due to its use as a common solvent in cleaning procedures, its previous results are not attributed to groundwater contamination. Arsenic and/or 1,1-dichloroethane were detected slightly above background levels in wells 11A, 11B, 11D, 12B, 13B, and 14A. To perform the required statistical analyses, these wells were resampled in triplicate on December 22 and 23, 1986. The chemical and statistical analyses from these wells were reported in a letter to Dave Slayton, MDNR from Mr. Tolbert dated February 11, 1987. These results from 1986 are summarized in attachments to this letter.

The annual report for a facility where ". . . the groundwater is monitored to satisfy the requirements of [40 CFR] 265.93(d)(4) [a Groundwater Quality Assessment Plan], the owner or operator must . . . annually . . . submit to the Regional Administrator a report containing the results of his or her Groundwater Quality Assessment Program, which includes, but is not limited to, the calculated (or measured) rate of migration of hazardous waste constituents in the groundwater during the reporting period." [40 CFR 265.94(b)]. The results included in the attachments to this letter contain all of the results of the GQAP collected during 1986. This consists of: 1) initial sampling results; 2) resampling analytical results; 3) statistical evaluation; and 4) evaluation of rate and extent of migration.

If you have any questions with the information in this letter, do not hesitate to call me.

Sincerely,

EDI ENGINEERING & SCIENCE

James Tolbert

James N. Tolbert
Hydrogeologist

JNT/mck

Enclosure

cc: D. Comfort, Quanex Corp.

4

EVALUATION OF RATE AND EXTENT OF MIGRATION

EXTENT OF MIGRATION

During the initial sampling on October 17, 1987, it was found that 1,1-DCA was present at concentrations slightly above background in wells 11A and 11B. The volatile organic scans done on these initial samples measured 6 ug/L in both of these wells. On December 22, 1986 these two wells were each sampled three times, and each of these samples also contained low levels of 1,1-DCA (all below 6 ug/L). On March 11 and 12, these wells, along with surrounding wells, were sampled again as part of the quarterly monitoring program. Wells 1, 9, 11A, 11B, 11D, 12A, 12B, 13A, 13B, 14A, and 16A were sampled. All wells, except 11B, were below the detection limit (1 ug/L) for 1,1-DCA. Well 11B was found to contain 4 ug/L 1,1-DCA.

It should be emphasized that wells 11D and 16A were both below the detection limit. Well 16A is directly down gradient from the impoundments (see Figure 1 and rate of migration section) and nearly directly downgradient from well cluster 11. This shows that 1,1-DCA has not migrated from the impoundments to this extent. Likewise, the absence of detectable 1,1-DCA in 11D shows that the plume has not migrated downward to that depth.

In addition, the low concentrations (3 to 6 ug/L) suggest a possible source from contamination during well construction. These monitoring wells were installed to monitor for trace metals, and, therefore, were not installed using the same cleaning procedures required for low level (single digit parts per billion) organics monitoring.

IN-SITU PERMEABILITIES

In-situ permeability calculations were done on several wells to determine the hydraulic conductivity of the aquifer. The Bouwer and Rice (1976) method was used to evaluate the data, and input parameters are shown on Table 2 along with the permeability values.

Values of permeability ranged from 0.03 ft/day (1.1×10^{-5} cm/sec) to 26.6 ft/day (9.4×10^{-3} cm/sec). These data are typical of glacial outwash deposits which range from clayey and silty sand to gravels. It is possible that higher permeability zones do exist in this aquifer. However, these zones, given the nature of this deposit, would not likely continue for great distances.

RATE OF MIGRATION OF 1,1-DCA

Water level measurements for several wells near the surface impoundments were measured on October 15, 1986 just prior to the initial sampling period (see Table 1). These data show that the disturbance in the groundwater flow pattern due to mounding around the impoundments occurs only locally. Within approximately 50 feet horizontally and 30 feet vertically the groundwater flow has nearly returned to its regional pattern.

The wells screened between 865 and 885 feet a.s.l. (indicated by the suffix "B" after the well number), provide a good indication of horizontal flow away from the impoundments. Figure 1 shows the head elevation contours and a general flow line passing through well cluster 11 for these wells. These data were chosen because there is good control on the horizontal gradient and they provide a maximum estimate in that the observed gradient at this level is larger than that above this level.

Groundwater flow down gradient of the impoundments below this level is unobtainable with the present well configuration. However, the trends established by head elevations in deeper wells near the impoundments (e.g., 11C, 11D, 12C, and 13C) suggest there is a regional upward movement of groundwater from the deeper zones of the aquifer, and that the downward flow of groundwater from the shallow wells (suffix "A") to the intermediate depth wells (suffix "B") is caused by the surface impoundments. This is substantiated by the fact that this downward gradient is lower in well clusters 14 and 15 than in well clusters 11 and 16 which are near surface waters and more directly downgradient from the impoundments.

Therefore, these data suggest that any potential downward migration of contaminants will be limited by a groundwater flow direction reversal, and that contaminant migration downward will decrease moving away from the impoundments. These data also support the selection of the intermediate depth wells (suffix "B") as good indicators of a maximum horizontal migration.

From Figure 1, the flow from the impoundments is generally to the west. South of the impoundments the direction shifts to the northwest. The gradient along the indicated flow line is 1.67×10^{-3}.

In-situ permeability tests were performed on several wells to determine the horizontal hydraulic conductivity of the aquifer (see above section on in-situ tests). These include wells 1, 5, 11B, 11C, 12A, 12B, 13A, 13B, 13C, 14A, 15A, 15B, 16A, and 16B. Well 12B recorded the highest hydraulic conductivity at 26.6 ft/day (9.4 X 10^{-3} cm/sec). This value is nearly an order of magnitude higher than any measured permeability downgradient from the impoundments. It should be noted that well 11A was untestable due to the oscillation of water level in the well during the test. At this time the relationship between these oscillations and formation permeability is unknown. It is possible that the oscillations are caused by high permeabilities.

If we accept the hydraulic conductivity measured at 11B (0.09 ft/day or 3.2 X 10^{-5} cm/sec) as representative of formation permeability away from the impoundments, we can calculate the groundwater velocity.

Using the relationship that:

$$v = \frac{ki}{n}$$

where:

v = average linear velocity of the groundwater

k = hydraulic conductivity

n = formation porosity

i = gradient

we can, by assuming a porosity of 35% (n = 0.35), calculate the groundwater velocity. In this case, the expected flow away from the impoundments is 4.3 X 10^{-4} ft/day (1.56 X 10^{-7} cm/sec).

However, this aquifer is typical of outwash deposits and is subject to changes in lithologies over short distances. Areas of both high and low hydraulic conductivities are observed. Well 11B is likely screened in an unusually low permeability zone. Flow within such an aquifer will concentrate in the high permeability zones. Therefore, in order to produce a conservative estimate of groundwater velocity (i.e., maximum likely velocity) away from the impoundments it is logical to pick the maximum measured permeability or one slightly higher. Consequently, in order to estimate the horizontal flow, a hydraulic conductivity of 2.83 ft/day (1 X 10^{-2} cm/sec) is assumed. Using the relationship outlined above, we find a maximum expected groundwater velocity of 0.14 ft/day (4.8 X 10^{-5} cm/sec). This estimate is also conservative in that it does not take into account natural attenuation by the soils or dispersion.

If we assume a vertical hydraulic conductivity at one-tenth the maximum horizontal (i.e., 2.83 ft/day or 1 X 10^{-3} cm/sec), we can also estimate the downward velocity. At well cluster 11 we observed a vertical gradient of 5.09 X 10^{-2} between wells 11A and 11C. This suggests an average flow velocity between them of 0.412 ft/day (1.45 X 10^{-4} cm/sec). However, the flow between 11C and 11D is upward with a relatively large gradient (8.72×10^{-2}) suggesting a direction reveral between wells 11B and 11C (i.e., between 859 and 885 feet a.s.l.). This would limit any potential downward migration of groundwater and contaminants.

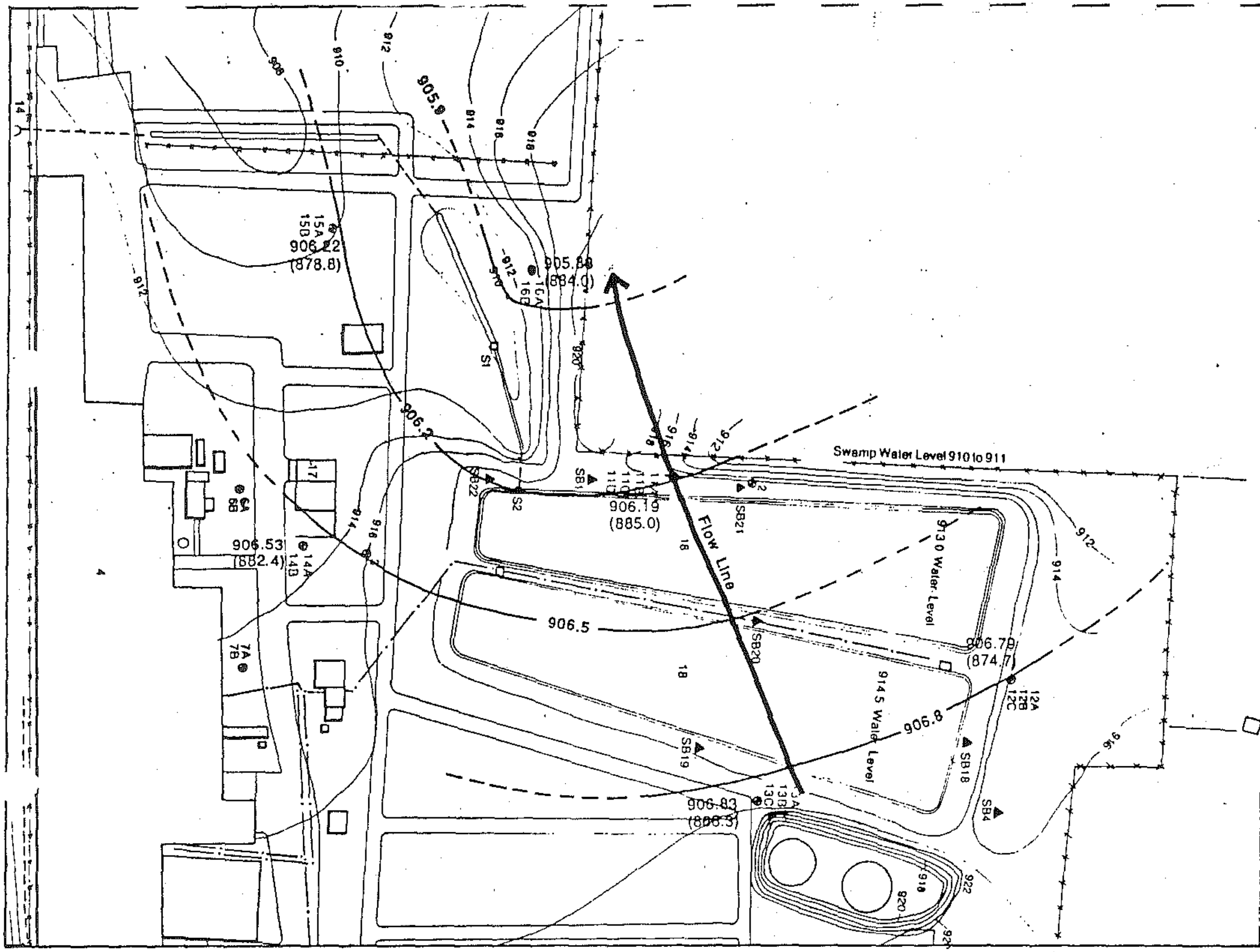

Figure 1

Flow Within Aquifer for Screened Interval Between 865 and 885

Quanex

May, 1987

20515

SOURCE: REFERENCE NO. 54

MICHIGAN DEPARTMENT OF NATURAL RESOURCES
SURFACE WATER QUALITY DIVISION
SEPTEMBER 25, 1986

STAFF REPORT

AQUATIC TOXICITY ASSESSMENT OF EFFLUENT FROM QUANEX CORPORATION; MICHIGAN SEAMLESS TUBE DIVISION SOUTH LYON, MICHIGAN FEBRUARY 26-28, 1986 MI 0001902

As part of a routine compliance inspection survey, the Michigan Department of Natural Resources, Great Lakes and Environmental Assessment Section conducted an in-lab, Daphnia magna acute toxicity test on a 24 hour composite sample of Quanex Corporation, Michigan Seamless Tube Division effluent (outfall 001). The acute toxicity test was conducted during the period of February 26-28, 1986. The primary objectives of the study were to assess the acute toxicity of the effluent to D. magna; and to evaluate whether additional acute toxicity tests should be performed at the site in the immediate future.

SUMMARY AND RECOMMENDATIONS

1. Effluent from outfall 630062 (001) was not acutely toxic to the invertebrate D. magna.

2. Effluent from outfall 001 is not considered a priority candidate for additional acute toxicity testing in FY 1986.

FACILITY DESCRIPTION

The Michigan Seamless Tube Company manufactures seamless steel tubing. Steel rods are used to make the seamless tubes by heating, displacing, cooling, pickling, cold drawing, annealing, and cleaning in alkali baths. The company's water usage is for boiler feed water, pickle house operations, noncontact cooling water make up (recycled in cooling towers), and contact cooling waters. All wastewater streams are combined and treated by a central station utilizing the slack quick lime process, the lime is used as a flocculent and a neutralization agent. The waste is then aerated and pumped to two series stabilization lagoons, where solids are allowed to settle before final discharge from outfall 001, via Yerkes drain to LimeKiln Lake.

METHODS

On February 24-25, 1986, MDNR-Compliance Section #2 personnel conducted a routine compliance inspection survey at the Quanex Corporation, Michigan

Seamless Tube Division located in South Lyon, Michigan. A 24-hour composite sample of final effluent was collected from outfall 630062 (outfall 001). The sample was cooled to 4°C and transported to Lansing for aquatic toxicity testing and analytical chemical characterization. Sample preservation techniques and organic scan parameter listing for the analytical samples are given in Appendices A and B.

During the period of February 26-28, 1986, a 48-hour D. magna static toxicity test was conducted on the 24-hour composite sample of Michigan Seamless Tube Division's outfall 001 effluent in the MDNR-Toxicity Evaluation Laboratory. Testing was performed according to the procedures described in ASTM D 4229; Standard Practice for Conducting Static Acute Toxicity Tests on Wastewater with Daphnia. The effluent sample and aerated, activated carbon filtered Lansing city water (diluent) were used to prepare nominal test concentrations of 100, 60, 36, 22, 13, and 0 (control) percent effluent. Four replicate 250 ml glass beakers, each containing 150 ml of test solution were prepared for each concentration and control. Beakers containing various test solutions, but without daphnids, were analyzed for selected physical and chemical parameters (dissolved oxygen, conductivity, pH, temperature, alkalinity, hardness) at the beginning and end of the exposure period.

D. magna neonates, 12+12 hours old, were used as test organisms. These daphnids were obtained from MDNR cultures and were fed algae prior to testing. Five daphnids were randomly selected and placed in each test chamber. The daphnids were observed after 24 and 48 hours of exposure to determine the number immobilized in each beaker. Immobilization, defined as the inability to swim for 5 seconds when stimulated, was used as the test end point.

RESULTS AND DISCUSSION

Acute toxicity data generated during the period of February 26-28, 1986, indicate that the Michigan Seamless Tube Division's effluent from outfall 001 appeared to exhibit a low level of acute toxicity to the invertebrate D. magna (Table 1). Immobilization of 10% of the daphnids in 100% effluent concentration constituted the only evidence of acute toxicity observed. This level of acute toxicity is well within the requirements of Rule 82 of the Michigan Water Quality Standards.

Test chamber water chemistry and physical data generated during the acute toxicity test are shown in Table 2. Water quality parameters in the test solutions did not change substantially during the exposure period and remained within their respective acceptable ranges for toxicity testing.

Wastewater characterization data generated for the composite sample of Michigan Seamless Tube Division's effluent (outfall 001) are presented in Table 3. The D. magna acute toxicity test results are consistent with the effluent sample's predicted acute toxicity based on a chemical specific analysis of the wastewater characterization data available.

Acute toxicity data generated in this study with *D. magna* suggest that Michigan Seamless Tube Division's outfall 001 effluent is satisfying the aquatic toxicity-related requirements of Rule 82 of the Michigan Water Quality Standards. Consequently, additional acute toxicity assessment studies are not recommended for this discharge during FY 1986 or 1987.

Report by: Scott Cornelius, Aquatic Biologist
Great Lakes and Environmental Assessment Section

Sample collection by: John Ecklund, Water Quality Technician

Aquatic toxicity testing by: Scott Cornelius, Aquatic Biologist

Table 1. Percent immobilization of *Daphnia magna* exposed to select concentrations of Michigan Seamless Tube Division's outfall 001 effluent during the period of February 26-28, 1986.

	Percent Immobilization/Exposed Period	
Percent Effluent	24 Hours	48 Hours
Control*	0	0
13	0	0
22	0	0
36	0	0
60	0	0
100	0	10

*Control was carbon-filtered Lansing city water.

Table 2. Chemical and physical analyses of control and selected effluent concentrations during the static, acute *Daphnia magna* toxicity test conducted on Michigan Seamless Tube Division's outfall 001 effluent during the period of February 26-28, 1986.

	BEGIN 02/26/86			END: 02/28/86		
Parameter	Control	36%	100%	Control	36%	100%
Dissolved oxygen (mg/l)	8.7	8.6	9.9	8.8	8.9	8.8
pH (S.U.)	7.6	7.8	7.7	7.6	8.0	8.2
Temperature (°C)	20.0	20.0	20.5	21.0	20.5	20.5
Conductivity (umhos)	362.8	691.8	118.9	378.8	765.3	130.5
Alkalinity (mg/l)	40	92	196	48	74	216
Hardness (mg/l)	100	270	580	116	316	640

Table 3. Chemical analyses of composite and grab samples of Quanex Corporation - Michigan Seamless Tube Division -- Outfall 001 effluent during the period of May 19-20, 1986

		Composite	Grab	Grab	Grab
	Date:	02/24/86- 02/25-86	02/24/86	02/24/86	02/25/86
Parameter	Time:	1020-1010	1040	1450	1020
Total organic carbon		3.08	2.98	3.33	2.75
BOD 5 - total		--	4.0	3.8	3.8
BOD 5 - carbonaceous		4.1	--	--	3.0
Suspended solids		15	7.0	<4	<4
Nitrate/nitrite nitrogen		3.8	4.2	4.0	4.2
Ammonia nitrogen		0.01	0.01	0.01	<0.01
Kjeldahl nitrogen		0.86	0.69	0.79	0.59
T. phosphorus		0.148	0.119	0.120	0.155
Oil and grease		--	<2.0	<2.0	--
Cadmium (ug/l)		0.2	<0.2	<0.2	<0.2
Chromium (ug/l)		<50	<50	<50	<50
Copper (ug/l)		<20	<20	<20	<20
Iron (mg/l)		1430	490	470	845
Mercury (ug/l)		<0.5	<0.5	<0.5	<0.5
Sulfate		402	--	--	--
Nickel (ug/l)		<50	<50	<50	<50
Lead (ug/l)		<50	<50	<50	<50
Zinc (ug/l)		340	380	370	410
Chloride		40.6	--	--	--

All values are mg/l unless otherwise indicated.

SOURCE: REFERENCE NO. 57

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n, Michigan 48178
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Quanex Michigan Seamless Tube Division

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JUL 30 1986
U.S. EPA, REGION V
WASTE MANAGEMENT DIVISION
HAZARDOUS WASTE ENFORCEMENT BRANCH

July 25, 1986

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0 1986
U.S. EPA, REGION V
WASTE MANAGEMENT DIVISION
HAZARDOUS WASTE ENFORCEMENT BRANCH

Mr. Joe Baker
USEPA Region 5
Mail Code 5HE-12
230 South Dearborn St.
Chicago, Illinois 60604

Re: Quanex - 1974 Oil Spill
EPA ID: MID-082-767-591

Dear Mr. Baker:

Enclosed please find the following information which you requested from Jim Tolbert of E.D.I. Engineering and Science pertaining to the 1974 oil spill at Quanex which we discussed briefly this morning.

1. Location and Extent of Oil Spill

Quanex Drawing FP-000-A-012 - dated 3/27/74

This drawing was made the week following the detection of the oil spill. The X's on the lower right hand section indicate where oil was found in excavations at the site. Oil was found on the south side of our plant from column line 10 through 31, or for a length of 420 feet.

Ground water monitor well #8 was installed in 1985 in line with column 43 and is shown as a red dot on this drawing.

2. Volume of Oil Spill and Date Discovered

Letter from U.W. Stoll and Associates - dated 6/10/74 - 3 pages

This letter summarized discussions of the then proposed oil interceptor system and the results of soil borings. It mentions the discovery date of March 21, 1974 and estimates the volume of oil spilled at 200,000 to 300,000 gallons.

3. Approximate Composition of Oil Spilled

Memo from D.A. Nebrig - dated 8/28/74 - 2 pages
Letter for MDNR - dated 8/27/74 - 1 page

Testing by the MDNR confirmed a match between oil discovered in the surface water west of our plant and oil sampled from under our plant. The oil was a high distillate grade of fuel oil equivalent to commercial grade #1, #2, or #3.

4. Detailed Soil Investigation

Report from Halpaert, Neyer, & Associates - dated 10/23/74
6 pages, 5 plates, 13 figures

Details soil and groundwater investigation undertaken in conjunction with the oil interceptor installation.

5. Current Status

Letter to H. Shakir of the MDNR - dated 6/25/86

We are presently collecting 5 to 6 gallons of oil per month from the interceptor and reporting semi-annually to the Michigan Department of Natural Resources. Total oil recovered to date is 289,593 gallons.

6. Ground Water Monitoring Data

MW-8 VOS lab report - dated 11/11/85 - 1 page
MW-8 VOS lab report - dated 3/02/86 - 1 page
MW-8 VOS lab report - dated 6/27/86 - 1 page

Volatile organic scans of groundwater samples down gradient of the oil spill area show low levels of 1,1 - Dichloroethane and trans -1,2 - Dichloroethene. Methylene chloride was not detected in any samples.

I Believe the information enclosed should be sufficient for your evaluation of the oil spill area. However, should you have any questions, please call me at 313-437-8117.

Sincerely,

Quanex Corporation
Michigan Seamless Tube Division

Donald F. Comfort

Donald F. Comfort, P.E.
Engineering Manager

cc: C. D. Simpson
D. L. Slayton - Michigan DNR
J. Tolbert - EDI Engineering and Science

SOURCE: REFERENCE NO. 60

TABLE 1

PARAMETERS CHARACTERIZING
THE SUITABILITY OF THE GROUNDWATER AS A DRINKING WATER SUPPLY

	Units	12-23-83	3-14-84	6-20-84	9-27-84
Monitoring Well 1					
Arsenic	(mg/l)	<0.001	<0.01	0.001	ND(0.001)
Barium	(mg/l)	0.19	<0.2	ND(2)	0.27
Cadmium	(mg/l)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)
Chromium	(mg/l)	ND(0.005)	0.005	ND(0.01)	ND(0.003)
Fluoride	(mg/l)	0.1	0.1	0.2	0.1
Lead	(mg/l)	<0.01	0.01	0.02	<0.01
Mercury	(mg/l)	ND(0.0002)	ND(0.0002)	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	<0.01
Silver	(mg/l)	ND(0.003)	0.006	0.004	0.008
Endrin	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.50)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.50)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.10)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	<3	<3	<3
Gross Alpha	(pCi/l)	9	<5	<5	5
Gross Beta	(pCi/l)	ND(8)	<8	<8	18
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)
Monitoring Well 2					
Arsenic	(mg/l)	0.014	<0.01	0.021	0.016
Barium	(mg/l)	0.11	<0.2	ND(2)	0.14
Cadmium	(mg/l)	ND(0.003)	0.003	<0.003	<0.003
Chromium	(mg/l)	0.005	0.013	ND(0.01)	<0.001
Fluoride	(mg/l)	0.2	0.2	0.1	0.20
Lead	(mg/l)	0.05	0.05	0.04	0.06
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	0.03	ND(0.01)	0.37
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	0.017
Silver	(mg/l)	ND(0.003)	0.005	ND(0.003)	<0.003
Endrin	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.50)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.50)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.10)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	4	<3	<3
Gross Alpha	(pCi/l)	ND(5)	8	<5	ND(5)
Gross Beta	(pCi/l)	ND(8)	26	<8	15
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)

TABLE 1

PARAMETERS CHARACTERIZING
THE SUITABILITY OF THE GROUNDWATER AS A DRINKING WATER SUPPLY

(Continued)

	Units	12-23-83	3-14-84	6-20-84	9-27-84
Monitoring Well 3					
Arsenic	(mg/l)	0.013	<0.01	0.007	0.006
Barium	(mg/l)	0.15	<0.2	ND(2)	0.23
Cadmium	(mg/l)	ND(0.003)	ND(0.003)	ND(0.003)	ND(0.003)
Chromium	(mg/l)	0.005	0.006	<0.01	<0.001
Fluoride	(mg/l)	0.3	0.3	0.3	0.4
Lead	(mg/l)	0.03	<0.01	<0.01	ND(0.01)
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	0.44	ND(0.01)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	0.01
Silver	(mg/l)	ND(0.003)	0.005	<0.003	0.005
Endrin	(ug/l)	ND(0.1)	ND(0.1)	ND(0.1)	ND(0.1)
Lindane	(ug/l)	ND(0.1)	ND(0.10)	ND(0.1)	ND(0.1)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(0.1)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.5)	ND(0.1)	ND(0.1)
2,4,5-TP Silvex	(ug/l)	ND(0.2)	ND(0.1)	ND(0.05)	ND(0.1)
Radium	(pCi/l	3	<3	<3	<3
Gross Alpha	(pCi/l)	8	6	<5	9
Gross Beta	(pCi/l	ND(8)	11	<8	16
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)
Monitoring Well 4					
Arsenic	(mg/l)	ND(0.001)	<0.01	0.001	0.001
Barium	(mg/l)	0.22	<0.2	ND(2)	<0.2
Cadmium	(mg/l)	ND(0.003)	<0.003	ND(0.003)	ND(0.003)
Chromium	(mg/l)	<0.005	0.010	ND(0.01)	ND(0.005)
Fluoride	(mg/l)	0.1	0.2	0.20	0.2
Lead	(mg/l)	0.02	<0.01	<0.01	ND(0.01)
Mercury	(mg/l)	ND(0.0002)	<0.0002	<0.0002	<0.0002
Nitrate, as N	(mg/l)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)
Selenium	(mg/l)	<0.01	<0.01	ND(0.01	<0.01
Silver	(mg/l)	ND(0.003)	0.013	0.004	0.012
Endrin	(ug/l)	ND(0.1)	ND(0.1)	ND(0.10)	ND(0.10)
Lindane	(ug/l)	ND(0.1)	ND(0.1)	ND(0.10)	ND(0.10)
Methoxychlor	(ug/l)	ND(0.5)	ND(0.5)	ND(0.50)	ND(0.50)
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
2,4-D	(ug/l)	ND(20)	ND(0.5)	ND(0.10)	ND(0.10)
2,4,5-TP Silvex	(ug/l)	ND(0.20)	ND(0.1)	ND(0.05)	ND(0.10)
Radium	(pCi/l)	ND(3)	8	<3	<3
Gross Alpha	(pCi/l)	ND(5)	7	<5	ND(5)
Gross Beta	(pCi/l)	ND(8)	19	<8	9
Coliform Bacteria	(/100 ml)	ND(2)	ND(2)	ND(2)	ND(2)

ND( ) Not detectable at the detection limit enclosed by the parentheses.

< Positive result at an unquantifiable concentration below indicated level.

TABLE 6

ASSESSMENT MONITORING STEP ONE: 9-24-85

	Units	1	2	3	4
Sodium	mg/l	61	48	62	62
Chloride	mg/l	38	40	36	56
Sulfate	mg/l	46	68	380	31
Bicarbonate	mg/l	100	470	210	480
Carbonate	mg/l	ND(1)	ND(1)	ND(1)	ND(1)
Iron (total)	mg/l	3.3	8.3	1.9	0.29
Manganese (total)	mg/l	0.92	1.5	0.64	2.1
Phenols	ug/l	7	4	8	4
Fluoride (total)	mg/l	0.3	0.4	0.5	0.3
Arsenic (total)	ug/l	<1	13	3	<10
Barium (total)	mg/l	0.84	0.35	0.42	1.0
Cadmium (total)	mg/l	<0.01	<0.01	<0.01	<0.01
Chromium (total)	mg/l	<0.02	0.04	<0.02	<0.02
Lead (total)	mg/l	ND(0.05)	<0.05	<0.05	ND(0.05)
Mercury	ug/l	ND(0.2)	<0.2	ND(0.2)	<0.2
Selenium (total)	ug/l	<1	ND(1)	<1	<10
Silver (total)	mg/l	<0.02	<0.02	<0.02	<0.02
Benzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromodichloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromoform	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Bromomethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Carbon Tetrachloride	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chlorobenzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroethylvinylether, 2	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloroform	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Chloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
cis-1,3-Dichloropropene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Dibromochloromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1-Dichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)

TABLE 6

ASSESSMENT MONITORING STEP ONE: 9-24-85

(Continued)

	Units	1	2	3	4
1,1-Dichloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,2-Dichloropropane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Ethylbenzene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Methylene Chloride	ug/l	20	21	14	11
1,1,2,2-Tetrachloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Tetrachloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Toluene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trans-1,3-Dichloropropene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trans-1,2-Dichloroethylene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1,1-Trichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
1,1,2-Trichloroethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trichloroethene	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Trichlorofluoromethane	ug/l	ND(1)	ND(1)	ND(1)	ND(1)
Vinyl Chloride	ug/l	ND(1)	ND(1)	ND(1)	ND(1)

ND( ) Not detectable at detection limit enclosed by parentheses.

< Positive result at an unquantifiable concentration below indicated level.

TABLE 10

CHEMICAL ANALYSIS OF 10-23-85 GROUNDWATER SAMPLES

	Units	Blank	S1	S2	1	2	3	9	11A
Arsenic, total	ug/l	<2.0	<2.0	<2.0	4.4	4.5	<2.0	<2.0	2.8
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	<0.50	<0.50	<0.50	1.04	<0.50	<0.50	0.57	<0.50
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	<1.0	31	30	46	56	46	39	38
Bromide	mg/l	0.11	0.90	0.96	2.2	4.5	0.96	0.80	0.58
Chloride	mg/l	1.6	35	34	29	39	36	36	35
pH	S.U.	8.40	9.19	8.87	7.51	8.61	7.28	7.42	8.24

	Units	11B	11C	11D	12A	12B	12C	13A	13B
Arsenic, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	0.80	<0.50	0.55	<0.50	0.53	0.50	1.1	0.85
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	61	58	58	44	48	46	50	54
Bromide	mg/l	0.62	0.54	0.54	0.43	0.96	0.43	1.4	0.66
Chloride	mg/l	37	39	45	36	78	31	35	50
pH	S.U.	7.64	7.87	7.81	8.15	7.89	8.25	7.30	7.01

	Units	13C	14A	14B	15A	15B	16A	16B
Arsenic, total	ug/l	2.2	<2.0	<2.0	<2.0	<2.0	<2.0	2.3
Chromium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Copper, total	mg/l	0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01
Lead, total	mg/l	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Silver, total	mg/l	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium, total	ug/l	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Barium, total	mg/l	<0.50	0.80	1.1	<0.50	<0.50	<0.50	<0.50
Cadmium, total	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Calcium	mg/l	46	71	61	40	42	41	35
Bromide	mg/l	0.38	1.5	0.62	0.29	0.59	0.54	0.43
Chloride	mg/l	25	97	36	20	36	35	36
pH	S.U.	7.50	6.86	6.67	7.70	7.49	7.17	7.40

< Not detected at the indicated detection limit.

SOURCE: REFERENCE NO. 64

PARAMETERS ESTABLISHING GROUND-WATER QUALITY

PARAMETER	(UNIT)	WELL # 1 Upgradient X Downgradient Q1	Q2	Q3	Q4	WELL # 2 Upgradient Downgradient X Q1	Q2	Q3	Q4	COMMENTS
Chloride	(mg/l)	54	46	40	50	34	39	42	41	
Iron	(mg/l)	4.1	4.5	5.9	3.8	4.2	8.6	16	20	
Manganese	(mg/l)	0.65	0.82	0.74	0.66	1.0	1.6	1.9	1.3	
Phenols	(ug/l)	9	4	8	ND(4)	14	ND(4)	7	ND(4)	
Sodium	(mg/l)	44	47	41	40	45	50	43	4.7	
Sulfate	(mg/l)	760	870	1000	950	120	140	160	150	

PARAMETER	(UNIT)	WELL # 3 Upgradient Downgradient X Q1	Q2	Q3	Q4	WELL # 4 Upgradient Downgradient X Q1	Q2	Q3	Q4	COMMENTS
Chloride	(mg/l)	39	43	47	44	45	44	55	46	
Iron	(mg/l)	6.5	3.3	3.8	6.9	0.89	3.2	0.28	1.2	
Manganese	(mg/l)	0.57	0.58	0.58	0.58	1.8	1.8	2.3	1.8	
Phenols	(ug/l)	ND(4)	4	5	ND(4)	ND(4)	ND(4)	ND(4)	ND(4)	
Sodium	(mg/l)	62	56	61	5.0	54	58	55	5.4	
Sulfate	(mg/l)	220	280	300	320	1800	2200	2800	2800	

Q = Quarter

Q1 = December 22-23, 1984
Q2 = March 13-14, 1984
Q3 = June 20, 1984
Q3 = September 27, 1984

ND = not detectable at the detection limit enclosed by parantheses.

DRINKING WATER SUITABILITY PARAMETERS

PARAMETER (UNIT)	Upgradient X Downgradient ___ Well # 1				Upgradient ___ Downgradient X Well # 2				COMMENTS
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
Arsenic (mg/l)	<0.001	<0.01	0.001	ND(0.001)	0.014	<0.01	0.021	0.016	
Barium (mg/l)	0.19	<0.2	ND(2)	0.27	0.11	<0.2	ND(2)	0.14	
Cadmium (mg/l)	ND(0.003)	ND(.003)	ND(.003)	ND(0.003)	ND(.003)	0.003	<0.003	<0.003	
romium (mg/l)	ND(.005)	0.005	ND(.01)	ND(0.003)	0.005	0.013	ND(.01)	<0.001	
Fluoride (mg/l)	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.20	
Lead (mg/l)	<0.01	0.01	0.02	<0.01	0.05	0.05	0.04	0.06	
Mercury (mg/l)	ND(.0002)	ND(0.0002)	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N (mg/l)	ND(.01)	ND(.01)	ND(0.01)	ND(0.01)	ND(.01)	0.03	ND(0.01)	0.37	
Selenium (mg/l)	<0.01	<0.001	ND(0.01)	<0.01	<0.01	<0.001	ND(0.01)	0.017	
Silver (mg/l)	ND(.003)	0.006	0.004	0.008	ND(.003)	0.005	ND(0.003)	<0.003	
Endrin (ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Lindane (ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Methoxychlor (ug/l)	ND(.5)	ND(.50)	ND(.50)	ND(0.50)	ND(.5)	ND(.50)	ND(0.50)	ND(0.50)	
Toxaphene (ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D (ug/l)	ND(20)	ND(.50)	ND(.10	ND(0.10)	ND(20)	ND(.50)	ND(0.10)	ND(0.10)	
2,4,5-TP Silvex (ug/l)	ND(.2)	ND(0.10)	ND(.05)	ND(0.10)	ND(.2)	ND(.10)	ND(0.05)	ND(0.10)	
Radium (pCi/l)	ND(3)	< 3	<3	< 3	ND(3)	4	< 3	<3	
Gross Alpha (pCi/l)	9	< 5	<5	5	ND(5)	8	< 5	ND(5)	
Gross Beta (pCi/l)	ND(8)	< 8	<8	18	ND(8)	26	< 8	15	
Coliform Bacteria (/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.

EPA Identifier: MID-082 767 591

DRINKING WATER SUITABILITY PARAMETERS

PARAMETER (UNIT)	Upgradient ___ Downgradient X Well # 3				Upgradient ___ Downgradient X Well # 4				COMMENTS
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
3enic (mg/l)	0.013	<0.01	0.007	0.006	ND(.001)	<0.01	0.001	0.001	
Barium (mg/l)	0.15	<0.2	ND(2)	0.23	0.22	<0.2	ND(2)	<0.2	
Cadmium (mg/l)	ND(.003)	ND(.003)	ND(0.003)	ND(0.003)	ND(.003)	<0.003	ND(.003)	ND(.003)	
Chromium (mg/l)	0.005	0.006	<0.01	<0.001	<0.005	0.010	ND(.01)	ND(0.005)	
Fluoride (mg/l)	0.3	0.3	0.3	0.4	0.1	0.2	0.20	0.2	
Lead (mg/l)	0.03	<0.01	<0.01	ND(0.01)	0.02	<0.01	<0.01	ND(.01)	
Mercury (mg/l)	ND(.0002)	<0.0002	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N (mg/l)	0.44	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)	
Selenium (mg/l)	<0.01	<0.001	ND(0.01)	0.01	<0.01	<0.01	ND(0.01)	<0.01	
Silver (mg/l)	ND(.003)	0.005	<0.003	0.005	ND(.003)	0.013	0.004	0.012	
Endrin (ug/l)	ND(.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Lindane (ug/l)	ND(.1)	ND(0.10)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Methoxychlor (ug/l)	ND(.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(.5)	ND(0.5)	ND(.50)	ND(0.50)	
Toxaphene (ug/l)	ND(1.0)	ND(1.0)	ND(0.1)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D (ug/l)	ND(20)	ND(0.5)	ND(0.1)	ND(0.1)	ND(20)	ND(0.5)	ND(.10)	ND(0.10)	
2,4,5-TP Silvex (ug/l)	ND(0.2)	ND(0.1)	ND(.05)	ND(0.1)	ND(0.20)	ND(0.1)	ND(.05)	ND(0.10)	
adium (pCi/l)	3	<3	<3	<3	ND(3)	8	<3	<3	
Gross Alpha (pCi/l)	8	6	<5	9	ND(5)	7	<5	ND(5)	
Gross Beta (pCi/l)	ND(8)	11	<8	16	ND(8)	19	<8	9	
Coliform Bacteria (/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.

SOURCE: REFERENCE NO. 83

STATE OF MICHIGAN

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

A. GENE GAZLAY, Director

Pointe Mouillee State Game Area
RFD #2
Rockwood, Michigan 48173
August 27, 1974

Mr. D.A. Nebrig
Chief Engineer
Michigan Seamless Tube Company
South Lyon, Michigan 48178

Dear Mr. Nebrig:

Spectrum numbers 3083 thru 3088 cover the period from 3-19-74 to 3-21-74. In order to understand the tracings it is necessary to compare them to each other or a standard.

The tracings are all very similar and appear to be from the same source.

Spectrum numbers 3406 thru 3410 cover the period 3-22-74 thru 3-23-74. These tracings appear to be identical. The sample analyses indicate that the oil at Dixboro Road and the oil found under the floor inside the plant is the same.

If you need further help or information, please feel free to contact this office.

Yours Truly,

WATER RESOURCES COMMISSION

Wayne E. Denniston

Wayne E. Denniston, P.E.
Basin Engineer

cc: J. Bohunsky
WD:gm

MICHIGAN

could be determined. Also, our investigation was to investigate and determine both the horizontal and vertical limits of the oil seepage to insure that the pipe would intercept the fuel seeping toward Yerkes Drain.

During our initial meetings and discussions, and prior to our preparation of the investigation program, information obtained from previous investigations was made available to us. Basically, the information consisted of data obtained by Michigan Seamless Tube Company personnel and by an outside consultant. Information by Michigan Tube personnel consisted of the making of test holes in the plant floor and along the north bank of Yerkes Drain. These test holes provided preliminary information on the limits of the fuel oil. Additional information was obtained by U. W. Stoll Associates during their investigation performed in May of 1974. As part of that investigation, three test borings were drilled by Raymond International, Inc., at the locations shown on our Test Pit Location Plan, Plate 1. Also, 6 inch diameter steel casings were lowered into the hole for future ground water level observations. From that investigation, it was concluded that the ground water profile generally falls from north to south, with ground water movement toward Yerkes Drain. Also, the on-site soils were determined to be generally sands and gravels sufficiently permeable to allow the fuel oil to essentially "ride" over the ground water, toward Yerkes Drain. Based on these findings, the general concept of the 24 inch perforated pipe interceptor was formulated. Since all the data from the previous investigations are available to the owner and to Hoyem Associates, Inc., those data are not included with this report.

COPY

Based on the project's requirements, and on the available information, our firm prepared a program for obtaining the required information. We planned to utilize test pits along the proposed pipe location to determine water seepage rates and presence of the fuel oil. If this procedure were to prove unsatisfactory due to excessive caving of the test pits, test borings were then going to be utilized. In addition, depending on conditions encountered, soil samples were going to be analyzed for presence of oil by a testing laboratory.

On October 1, 1974, eight test pits (Nos. 1 through 8) were excavated at the locations shown on the Test Pit Location Plan, Plate 1. All test pits were excavated by the use of a backhoe provided by Merle Farley under the full-time supervision of our firm's personnel. During the course of the excavations, our representatives classified subsoils encountered, determined ground surface elevations at test pit locations, noted ground water and oil data, took representative soil samples, performed permeability tests, and provided overall direction of the excavation procedures. The pits were excavated to depths ranging from 8 feet to 11 feet. Several test pits were left open for several hours for water level observations while others were immediately backfilled upon completion due to excessive caving of the test pit sides. Subsequent to final water level observations and measurements, all test pits with the exception of Test Pit No. 3 were backfilled with the excavated soil.

Subsoil conditions disclosed by the test pits have been evaluated and are presented herein in the form of individual Logs of Test Pits for each pit, Figures 1 through 8. These logs present the stratigraphy of the soils encountered, sample data, water and oil conditions, personnel involved and other pertinent information. All our elevations are based on a datum provided by Hoyem Associates, Inc. Specifically, our elevations are referenced to the top of casing of Test Boring No. 1 by Raymond International, taken as Elevation 913.48.

The investigation was begun at the west end of the site with Test Pit No. 1. Based on previous information, presence of fuel oil was not expected at this location; however, when oil was encountered, Test Pit No. 2 was excavated at a point further west, as shown on Plate 1. A minimal inflow of oil was noted within this test pit also. However, due to the existence of gas lines and closeness of railroad tracks further west of this location, it was decided to leave this pit open for observation and continue the investigation to the east. All the subsequent holes excavated on October 1, with the exception of Test Pit No. 6, indicated the presence of fuel oil. Of particular note, heavy oil flows were observed in Test Pit No. 3, where approximately 200 gallons of oil were actually pumped out in approximately 15 minutes, and Test Pit No. 5. During the course of the day, water seepage information was obtained in three test pits left open for such observations.

C O P Y

Although considerable information was obtained during the course of the day, it was deemed desirable to be able to monitor ground water level as well as presence of fuel oil at later dates. Therefore, a 4 inch diameter perforated plastic pipe was installed in each of three test pits (Nos. 2, 4 and 6) for later observations. It should be noted that the three steel casings previously installed by Raymond International were found to be plugged at the bottom, and reliable ground water and oil data could not be obtained from them. Test Pit No. 3 was left open so that Michigan Seamless Tube Company could subsequently pump additional oil from this location.

The following week, our firm obtained additional oil and ground water data. This information, presented as Plate 2, and the findings from our investigations were discussed on October 8, 1974, with Mr. Jim Partridge of Hoyem Associates, Inc. As a result of our findings, certain revisions were made to the proposed interceptor system, most importantly an extension of the system to the east and a revision in the pipe slope. All the findings were then discussed at a meeting held on October 9, 1974 at Michigan Seamless Tube Company offices. The meeting was attended by Messrs. Dick Russell, Ken Dodds, Don Nebrig, Marv Brickey, Dave Usher, Jim Partridge and the writer. At that meeting, preliminary data obtained by our firm was discussed relative to the proposed interceptor system and the general project's requirements. At that meeting, certain recommendations or decisions were made, as follows:

1. As already mentioned, the proposed pipe would be extended further east.

2. The ground water data indicated that the groundwater table has a downward gradient from east to west as well as from north to south. Therefore, the slope of the east-west pipeline interceptor was revised to closely parallel the groundwater table east-west gradient.

3. The writer reported that, based on ground water data obtained during our investigation, ground water and oil flows that could be expected to flow into the pipe interceptor were on the order of approximately 5 to 100 gallons per minute, with flows in the lower range being most likely.

4. The bottom of oil encountered extended below the lower limits of the proposed pipe. Therefore, in order to prevent oil flow toward Yerkes Drain, a positive barrier must be provided at the pipe location, as originally shown on the design plans.

5. Since the westerly limit of oil seepage had not been exactly determined, it was considered necessary to conduct an additional investigation toward the west end of the site.

6. In view of the large quantity of oil seeping into Test Pit No. 3, the test pit was to be enlarged and a simple wooden box bracing system was to be installed to prevent cave-in of the pit sides, to allow installation of an oil skimmor to pump the oil to a storage tank.

C O P Y

Our firm made arrangements for Mr. Merle Farley to enlarge Test Pit No. 3 and construct the required bracing system on October 10, 1974. At that time, Marine Pollution installed and began operation of the oil skimmer system.

On October 11, 1974, five additional holes were made at the west end of the site. The test holes (Test Pit Nos. 9 through 13) were excavated at the locations shown on the Test Pit Location Plan, Plate 1. Test Pit Nos. 9 through 12 were excavated with a backhoe under the supervision of our field engineer. Test Pit No. 13, because of obstructions existing in that general area, could not be excavated with a backhoe and was made by our engineer utilizing a 6 inch diameter bucket auger. In all the holes, a 4 inch diameter perforated plastic pipe was installed for later ground water and oil observation. It should be noted that no clear evidence of fuel oil was disclosed during the excavations of these test pits. Subsoil conditions disclosed by the test pits are presented as Figures 9 through 13.

On October 14 and 15, additional water and fuel levels were obtained. Of note was that Test Pit No. 6, which for several days had indicated no presence of oil, now contained oil accumulation within the pipe. No oil was evident in the last five test pits made; however, these measurements were considered inconclusive by our firm, since heavy rains which might have affected the results had fallen on October 13 and 14. Therefore, as we reported at a meeting held on Tuesday, October 15, 1974, we would make additional readings on Friday, October 18 to obtain more reliable information. It was also agreed that we would prepare a final report based on the data obtained on that date. At the aforementioned meeting of October 15, 1974, attended by Messrs. Russell, Dodds, Nebrig, Brickey, Partridge, and the writer, it was also agreed that the writer would contact Messrs. Partridge and Brickey after obtaining the Friday water readings. This was to advise them whether any significant changes in water and oil levels had occurred, possibly resulting in revisions to the collector system design. At the meeting, the possibility of extending the collector system to the northwest was also discussed, in the event that subsequent monitoring of the observation pipes indicated oil seepage beyond the western limits of the proposed system. Also of note was that your firm had decided to excavate an additional pit and, as in Test Pit No. 3, pump oil from it at as fast a rate as possible, hopefully to deplete the major source of oil seepage prior to the installation of the collector system. At our suggestion, the new pump pit was excavated and constructed in the area of Test Pit No. 5, where a large inflow of fuel oil was noted at the time of the field investigation.

Our firm made a complete check of all installed pipes on October 18, 1974 and discovered inconsequential changes in the ground water and oil data reported at our meeting of the 15th. As agreed, this information was relayed to Messrs. Partridge and Brickey on the same day. Also, those data are presented herein as Plate 3.

COPY

Based on all the available information from previous investigations, from data obtained by our investigation, and from discussions with members of your firm and Mr. Jim Partridge of Hoyem Associates, Inc., the following summarizes our findings, observations, and recommendations:

1. The subsoils encountered on the site are generally granular in nature and, therefore, have relatively high permeabilities. However, as indicated on the individual test pit logs, the materials encountered below the groundwater table vary from fine sands with traces of clay to more coarse sand and gravel strata. In Test Pit Nos. 3 and 5, for example, where the largest inflow of oil was noted, the materials below approximately a 4 foot depth consist of a medium to coarse sand with some gravel, which have relatively high permeabilities. In Test Pit No. 2, however, sufficient clay binder was present in the subsoils that the permeability of these materials would be markedly lower. An even larger percentage of clay was noted in subsoils encountered at the west end of the site (Test Pit Nos. 10, 11 and 12). Thus, soil permeabilities can be expected to vary widely along the proposed length of the interceptor.

   Results from our field permeability tests in the various soil strata indicate permeability values ranging from approximately .0001 feet per minute to .002 feet per minute. Based on these values, and assuming a pipe length of approximately 450 feet, a flow of approximately 5 to 100 gallons per minute could be expected at the outlet end of the pipe. However, based on available information, we expect that flows will most likely be in the lower range of the estimated values (i.e., 5 to 10 gallons per minute).

2. In view of the visual observation allowed by the test pits, and based on the information obtained during the investigation and from the observation pipes installed in several of the test pits, it was not considered necessary to conduct laboratory tests on

soil samples to determine presence of oil.

3. Information developed during this investigation has disclosed that the general gradient of the groundwater table is in a southwest direction, toward Yerkes Drain.

Observed ground water conditions are presented as Ground Water Profiles, Plates 4 and 5. Plate 4, which represents the east-west profile, indicates that the top of fluid (oil) generally parallels the ground surface profile at approximately a 5 foot depth. Top of ground water (and therefore thickness of oil) was noted to vary throughout the length of the investigation. Plate 5, which represents an average ground water condition in a south-west direction, was developed from previous and present data.

It is our belief that the top of oil profile represents the approximate level of the natural groundwater table (i.e., if the oil were removed). Therefore, it is expected that, as the oil is collected and removed, the thickness of oil will decrease and the top of ground water level will rise to approach the present top of oil level. As the oil source is depleted, the groundwater table will again approximately coincide with the original level, prior to the oil seepage.

COPY

4. As shown on Plate 4, the bottom limit of oil along the path of the proposed pipe presently extends below the bottom of the proposed pipe. Therefore, to prevent the oil from bypassing the collector system, a positive barrier extending to approximately Elevation 904 should be provided. Such a barrier, consisting of a continuous P. V. C. liner, has already been incorporated in the design.

5. The proposed collector system calls for the excavation of a trench to approximately Elevation 903, installation of the P. V. C. barrier, backfilling of the trench to the proposed pipe bedding elevation, installation of the pipe, and backfilling over the pipe to meet existing grade. In the initial stages of operation for the completed system, it is expected that the bottom of oil will extend below the invert of the pipe, and will collect behind the P. V. C. barrier, within the pea gravel. As the oil source is depleted, the oil thickness should decrease and the oil collected within the pea gravel should rise above the invert of the pipe, from where it will be discharged into the collecting chamber. However, in the event that the groundwater table should for some reason lower to below the invert of the pipe, provisions should be made to allow collection of the oil existing within the pea gravel, behind the P. V. C. barrier. At one of the meetings, the writer recommended that a vertical slot be constructed on the collecting manhole wall, extending from the invert of the pipe to the bottom of the manhole. This slot could be plugged and kept inoperative during periods of normal ground water conditions. If the groundwater table were to lower, however, the slot could be opened to allow seepage of oil and water contained within the pea gravel trench into the collecting manhole. We understand that such provision has been incorporated in the design.

6. Information obtained on October 18, 1974 indicated that oil was absent at the locations of Test Pit Nos. 9 through 13. However, we do recommend periodic monitoring to check for presence of oil. The proposed collector system could then be re-evaluated based on the later information.

7. Pumping from Test Pit Nos. 3 and 5 should continue at as rapid rate as possible, so as to pump as much fuel as possible from the area prior to the installation of the collector system.

8. The excavations required for the construction of the proposed system will extend below the groundwater table. In view of the relatively high permeability of the subsoils, it is expected that large volumes of water will flow into the excavation. Therefore, it is recommended that positive ground water control measures be undertaken during the installation of the proposed system. Consideration should be given to the use of wellpoints or deep wells to temporarily lower the groundwater table during construction.

COPY

We hope that this report provides all the required information. If you have any questions regarding any of the items in this report, or should you require additional information, please do not hesitate to call on us. We appreciate the opportunity of being of service to you on this project.

Very truly yours,

HALPERT, NEYER & ASSOCIATES

Benedict Tiseo

Benedict Tiseo, P.E.

BT/cfl

Enclosures

cc: Mr. Jim Partridge

SOURCE: REFERENCE NO. 103

Quanex Corporation
400 McMunn
South Lyon, Michigan 48178
(313) 437-1715

Quanex

June 29, 1981

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
Office of Hazardous Waste Management
Box 30038
Lansing, MI 48909

Attention: Ron Waybrant

Gentlemen:

Enclosed is our Waste Characterization Report, with an enclosure from an independent laboratory, E.R.G. Associates of Ann Arbor, Michigan. All questions have been answered except Section D, 6c. We have not conducted this test since we were unaware of the necessity. Should you feel it so we will be obliged to conduct it. With our test result being at a minimum or non-detectible to critical constituents, we would hope that we could gain approval to start removal of our by-product to the landfill now.

Sincerely yours,

QUANEX CORPORATION
MICHIGAN SEAMLESS TUBE DIVISION

M. P. Robinson

M. P. Robinson
Environmental Engineer

MPR/ad

Enclosure

RECEIVED
JUN 23 1981
ACT 64

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF ENVIRONMENTAL QUALITY
SOLID WASTE ADMINISTRATION
32 EAST HANOVER STREET, TRENTON, N.J. 08625

JACK STANTON
DIRECTOR

LINO F. PEREIRA
ADMINISTRATOR
SOLID WASTE MANAGEMENT

June 16, 1981

MS. R. Garrison
Michigan Service Division
Office of Hazardous Waste Mgt.
P.O. Box 30038
Lansing, Michigan 30038

Dear MS. Garrison:

This letter is to confirm our meeting on Monday, June 26, 1981, at 9:30 a.m.. If a conflict arises, please contact me prior to Friday, June 19, 1981, as this is my scheduled departure date.

The purpose of my trip is to meet individually with officials from the states of Pennsylvania, Ohio, Indiana, Illinois and Michigan to discuss and share ideas concerning State Manifest Programs and Hazardous Waste Vehicle Registration. The State of New Jersey is in the process of redesigning its hazardous waste ADP system. As part of this process, we are addressing existing problems. I am anxious to discuss our program with you and see if we share any of the same problems, or to see if either of us have identified new problem areas. Some of the key points I am looking forward to discussing are:

1. Michigan and New Jersey's Manifest Program:

   a. General operations
   b. ADP capabilities
   c. Problems shared by New Jersey and Michigan and potential solutions

2. The possibility of sharing pertinent Manifest data:

   a. Periodic reports on the movement of hazardous waste between Michigan and New Jersey.
   b. Paper routes, tapes, telecommunications

3. The National Manifest Form:

   a. Its potential format
   b. Expected date of implementation

4. Michigan and New Jersey's Vehicle Re[illegible]ation Program

   a. General operation
   b. ADP capabilities
   c. Use by enforcement agencies
   d. Fleet registration
   e. Fee schedules

If you wish to discuss topics outside of the ones identified above, we can use this opportunity to do so.

I am looking forward to meeting with you and I am hopeful that this meeting will be beneficial to both of our programs.

Very truly yours,

David J. Lee

David J. Lee
Environmental Scientist

DJL:hjg

1C: Howard Wagbrant
Fore
Dennis

CLOW

HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

January 14, 1981

Great Lakes Environmental Services, Inc.
16099 Common Road
P.O. Box 396
Roseville, MI 48066
Attn: Mr. Dennis A. Gari[illegible], P.E.

Samples received 12-2[illegible]-80

Samples taken 12-23-80

HYDRO NO:	44554	44555	44556
CUST. ID:	Drying Beds #1	Drying Beds #4	Drying Beds #5
Solids, Total, %	43.1	45.7	48.1
Solids, Total Vol., mg/kg	71,800	69,000	67,800
Non Combustible Ash, mg/kg	928,000	931,000	932,200
Lead, Pb, mg/kg	73	25	24
Zinc, Zn, mg/kg	3,400	3,700	3,900
Nickel, Ni, mg/kg	220	230	230
Copper, Cu, mg/kg	52	77	69
Beryllium, Be, mg/kg	< 0.2	< 0.1	< 0.2
Cadmium, Cd, mg/kg	7.0	1.5	1.5
Chromium, Total, Cr, mg/kg	250	290	290
Chromium, Hex., Cr, mg/kg	< 0.1	< 0.1	< 0.1
Mercury, Hg, mg/kg	< 0.1	< 0.1	< 0.1
Arsenic, As, mg/kg	3.9	6.0	4.4
Nitrogen, Kjeldahl, N, mg/kg	430	640	350
Phenol, mg/kg	0.2	0.1	0.2
Total Halogens, mg/kg reported as Chlorine	130	86	82
Bromine	29	31	35
Organic Halogens, mg/kg reported as Chlorine	110	48	47
Bromine	28	30	34

CLOW HYDRO RESEARCH SERVICES
Water Management Division
Clow Corporation

Great Lakes Environmental Services, Inc.
16063 Common Road
P.O. Box 396
Roseville, MI 48066
Attn: Mr. Dennis A. Guritza, E.P.

January 14, 1981

Samples received 12-29-80

Samples taken 12-23-80

HYDRO NO:	44554	44555	44556
CUST. ID:	Drying Beds #1	Drying Beds #4	Drying Beds #5
Sulfur, S, mg/kg	4,010	8,310	7,980
Phosphorus, Total, P, mg/kg	2,120	3,410	3,410
Oil & Grease, mg/kg	3,300	2,200	3,030
Cyanide, Total, mg/kg	< 0.2	< 0.2	< 0.3
pH	7.72	7.80	7.81
Flash Point, °F	> 140 passes test	> 140 passes test	> 140 passes test

Results reported on sample as received.

Linda Carey

Linda Carey/Manager
Analytical Services

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF HAZARDOUS WASTE MANAGEMENT
BOX 30038
LANSING, MICHIGAN 48909

WASTE CHARACTERIZATION REPORT

SECTION A. WASTE GENERATOR IDENTIFICATION INFORMATION

EPA IDENTIFICATION NUMBER: MID 08276 7591

BUSINESS NAME: Michigan Seamless Tube Division

ADDRESS: 400 McMunn Street

CITY: South Lyon, STATE: MI ZIP CODE: 48178

NAME AND TITLE OF CONTACT PERSON: Mel Robinson, Environmental Engineer

TELEPHONE NUMBER: (313)437-8117, Ext.140

SECTION B. COMMON NAME OF THE WASTE

ENTER TYPE OF WASTE (i.e. common name) characterized on this form and the source or process from which it was produced.

Dried Sludge Neutralized waste from Water Treatment

SECTION C. LISTED HAZARDOUS WASTE

HAZARDOUS WASTE NO.

1. If the waste is listed in tables 301 a, b, c, or d of Rule 299.6308, 299. 6309, 299.6310 or 299.6311, respectively or table 305 of Rule 299.6317, enter the hazardous waste number from the appropriate table .... N/A
2. If the waste is a discarded commercial chemical product, off-specification specie, container or spill residue of a substance listed in Table 302a, Rule 299.6312, or Table 302 b or c, Rule 299.6313 or 299.6314, respectively, enter the hazardous waste number from the applicable table .... N/A
3. If waste *contains* any substances listed in table 302 a, b, or c, Rule 299.6312, 299.6313,or 299.6314, respectively, enter their hazardous waste number(s) from the applicable table AND record the component concentrations.

   COMPONENT CONCENTRATION
   ____ to ____ % N/A
   ____ to ____ % N/A
   ____ to ____ % N/A
4. If the waste contains viable desease-causing agents listed in table 304, Rule 299.6316, enter the hazardous waste number(s) from the table .... N/A

SECTION D. HAZARDOUS WASTE BASED ON CHARACTERISTICS

	Test Results	Parameters	Reference
5. Ignitable Wastes			
5a. Liquid flash point test (aqueous solutions containing less than 24% alcohol by volume are excluded from this test).	> ~~X~~ to 60 °c	Flash Pt. 60°c	299.6201 (c) (i)
5b. Non-liquid — Is it ignitable based on conditions stated in the reference?	☐ Yes ☒ No	See Reference	299.6201 (c) (ii)
5c. Compressed gas — Is the waste a flammable compressed gas as defined in the reference?	☐ Yes ☒ No	See Reference	49 CFR § 173.300
5d. Oxidizer — Is the waste an oxidizer as defined in the reference?	☐ Yes ☒ No	See Reference	49 CRF § 173.151
5e. Enter "D001", as the hazardous waste number if the waste exceeds one or more of the parameters listed or meets the definition of a hazardous waste based on the reference			N/A
6. Corrosive Wastes (concentrated salt solutions are by definintion not coorosive)			
6a. Aqueous Solution — ph test	7.7 ph	See Reference	299.6201 (a) (i)
6b. Liquid-Steel (type SAE 1020) corrosion test	N/A mm/yr	Rate 6.35 mm/yr	299.6201 (a) (ii)
6c. Albino rabbit skin test — Is the tissue destroyed or irreversibly changed?	☐ Yes ☐ No	See Reference	229.6201 (a) (iii) & 49 CFR § 173.240
6d. Enter "D002", as the hazardous waste number if the waste exceeds one or more of the parameters listed			N/A

7. Reactive wastes
   - 7a. Is the waste normally unstable and capable of undergoing violent chemical or physical change without detonating? ☐ Yes ☒ No
   - 7b. Does it react with water forming potentially explosive mixtures with water? ☐ Yes ☒ No
   - 7c. When mixed with water, does it generate toxic gases, vapors, or fumes? ☐ Yes ☒ No
   - 7d. Is it a sulfide or cyanide bearing waste which when exposed to ph conditions between 2 and 12.5, can generate toxic gasses, vapors, or fumes? ☐ Yes ☒ No
   - 7e. Is the waste capable of detonation or explosive reaction when subjected to a strong initiating source or if heated under confinement? ☐ Yes ☒ No

7f. Is the waste capable of detonation or explosive decomposition or reaction at standard temperature and pressure? .... ☐ Yes ☒ No

7g. Is the waste a forbidden explosive as defined in 49 CFR § 173.51? ☐ Yes ☒ No

7h. Is the waste a Class A explosive as defined in 49 CFR § 173.53? ☐ Yes ☒ No

7i. Is the waste a Class B explosive as defined in 49 CFR § 173.88? ☐ Yes ☒ No

7j. If the answer to any of the questions 7a through 7i is yes, enter "D003", as the hazardous waste number. N/A

8. EPA Toxic Wastes -- Upon obtaining on extract of the waste as described on 40 CFR § 261, Appendix II, test for the components listed in Table 303, Rule 299.6315. For each component material that exceeds the extract concentration listed in the table, enter the hazardous waste number(s) and the tested concentration(s):

Hazardous Waste No.	Concentration
	N/A mg/l
	N/A mg/l
	N/A mg/l
	N/A mg/l

SECTION E. PHYSICAL STATE AT 25° C

9. What is the average density of the material? 686 Kg/cu. meter

10. Solids: Does the material produce dust if exposed to air movement? .... ☐ Yes ☒ No

11. Liquid — Sludge: What is the percent solids? .... %

Do the solids settle out? .... ☐ Yes ☒ No

Can the material be pumped? .... ☐ Yes ☒ No

Can the material be poured.? .... ☐ Yes ☒ No

12. Liquid: At what temperature does it freeze? .... 0 °

13. Gases: What is the maximum pressure of the container? .... N/A PSI

SECTION F. OTHER INFORMATION:

14. What is the maximum quantity of this waste that is generated per month? .... 105,000 kg

15. If the only hazardous waste numbers listed on this form are the numbers that have been entered for Item 3, enter the numbers in the space provided if the component concentration (Item 3) and the quantity of the waste generated (Item 14) cause the waste to be considered as a notification waste based on R 299.6201 (1) (g) (iii) and (iv), *figure A* of R299.6201(2), or *figure B* of R299.6201 (3): N/A N/A N/A

NOTE: If the hazardous waste numbers that have been entered under item 3, begin with the letter "P" use *figure A* to determine if it is a notification waste. If the number begins or ends with the letter "U" use *figure B*.

16. Are the hazardous wastes listed on this form disposed of onsite? No waste is disposed on siteN/A ☐ Yes ☐ No

17. If the waste is a hazardous waste, is it exempt under the small quantity exemptions pursuant to R 299.6203(2) and (3)? N/A ☐ Yes ☐ No

18. If tests were conducted in the evaluation of the waste, all of the following information shall be transmitted to the Department of Natural Resources with the waste characterization Record:
    - (a) The sampling procedure and the reasons for determining that the sample is representative of the waste.
    - (b) The results of all tests conducted.
    - (c) The accuracy and precision of any test conducted.

SECTION G. U.S. DEPT. OF TRANSPORTATION REPORTING REQUIREMENTS

Hazardous Materials Description and Shipping Name

Hazard Class UN/DA ID No.

Special Handling and Shipping Requirements

If the waste is hazardous and not exempt or excluded from management, or is a notification waste, send the completed form to the Department of Natural Resources, Office of Hazardous Waste Management, P.O. Box 30038, Lansing, MI 48909.

Signature Title Date

ERG sample number: AA54869
Sample description: Dried Sludge

Parameters and units	Results	detection limit
arsenic (mg/l)	0.025	
cadmium (mg/l)	ND	0.003
chromium (mg/l)	0.015	
lead (mg/l)	ND	0.010
barium (mg/l)	0.49	
mercury (mg/l)	ND	0.0002
selenium (mg/l)	0.001	
silver (mg/l)	0.009	
endrin (μg/l)	ND	0.090
lindane (μg/l)	ND	0.007
methoxychlor (μg/l)	ND	0.080
toxaphene (μg/l)	ND	0.61
2,4-D (μg/l)	ND	0.60
2,4,5-TP (μg/l)	ND	0.020

ND = non-detectable

G, TSD, PTB, PTA

Facility Management Plan
Attachment 20 Summary
Quanex, Michigan Seamless Tube Division
MID0827675[illegible]

<u>Background</u>

Notification and Part A were submitted per a 198[illegible] Consent Agreement.

The Quanex Corporation, located in South Lyon, Michigan, manufactures seamless steel tubing for a variety of industries. Plant processes include pickling, phosphate coating, alkaline cleaning, washing, annealing, and rust inhibitor coating operations.

Three hazardous wastes generated at this facility are subject to RCRA permitting requirements: waste barium compounds, corrosive solids, and spent pickle liquor. The waste barium compound and corrosive solids are stored in the hazardous container storage area before they are manifested for off-site disposal. The spent pickle liquor is lime neutralized on-site before it is discharged to two surface impoundments where it is stored until it is discharged to Yerkes Drain via an NPDES permitted outfall. No hazardous wastes are accepted from any off-site facilities.

The sludge (K063) which is generated during the lime neutralization was delisted in the June 4, 1984 <u>Federal Regisger</u> and took effect on December 5, 1984. The water fraction derived from the treatment of a listed waste is stored in the surface impoundments at the facility.

The facility indicated in their Part B that they will close the surface impoundments by November 8, 1988. EPA has stated that they will request that a formal Closure Plan be submitted.

<u>Environmental Significance</u>

Quanex Corporation is an environmentally significant facility. Potential prior releases have been identified on-site. Documentation of past spills and releases should be looked at and summarized during the file search that will be done as part of the Preliminary Assessment.

Prior to the installation of the surface impoundments, the waste pickle liquor (K062) was stored in 3 acid pits for a period of 34 years. Formal dismantling and clean up of these units has never occurred.

The facility pumps the delisted K063 sludge to drying beds. K062 liquid is mixed in along with the sludge that is pumped. It is therefore felt that the drying beds are regulated units, and groundwater monitoring should be implemented to ensure that continuing releases are not occurring.

The facility has also had a large underground fuel oil tank rupture, and are still in the process of purging the oil out of the soil and groundwater system.

Recommendations

A Preliminary Assessment site investigation (PA/SI) should be carried out. During the PA, a complete file search needs to be done in order to document past problems at the facility and to check for the presence of solid waste management units. A site investigation walk-over will be done with district and permit staff to check for solid waste management units. Production areas (loading and unloading areas) should be inspected to look for the presence of solid waste management units and evidence of spills. Any areas that may require Corrective Action should be identified.

A fully completed Attachment 20 and a finalized FMP will be submitted to EPA upon completion of the PA/SI. Further site investigation work may be recommended, if the PA and new groundwater monitoring wells establish the need for it.

7/15/85

Attachment 20

Name of Preparer: SCHOENBECK
Date: ______

Model Facility Management Plan

1. Facility Name: CLANEY MICHIGAN SEAMLESS TUBE DIV

2. Facility I.D. Number: MID 082767591

3. Owner and/or Operator: CLANEY CORP.

4. Facility Location: 400 MCMUNN ST
Street Address

SOUTH LYON	OAKLAND	MI	48178
City	County	State	Zip Code

5. Facility Telephone (if available): (313) 437-8117

6. Interim Status and/or Permitted Hazardous Waste Units and Capacities of Each Unit:

Type of Units	Size or Capacity	Active or Closed
✓ Storage in Tanks or Containers	11,000 gal	active
___ Incinerator		
___ Landfill		
✓ Surface Impoundment	2 impoundments 5,800,000 gal	active
___ Waste Pile	1 dry bed 7 acres	
___ Land Treatment		
___ Injection Wells		
___ Others (Specify)		

7. Permit Application Status: ______ (HWDMS action item number)

8. Identification of Hazardous Waste Generated, Treated, Stored or Disposed at the Facility: (may attach Part A or permit list or reference those documents if listing of wastes is exceptionally long - in that case, to complete this question list wastes of greatest interest and/or quantity and note that additional wastes are managed)

Type of Waste	Quantity	Generated, Treated, Stored or Disposed (note appropriate categories)
??? K062	3,000,000 gal	storage of water derived from the treatment of hazardous waste

9. Review of Response to Solid Waste Management Questionaire indicates: (check one)

✓ Solid Waste Management Units exist (other than previously identified RCRA units)

_______ No Solid Waste Management Units exist (other than previously identified RCRA units)

_______ It is unclear from review of questionaire whether or not any solid Waste Management Units exist

_______ Respondent indicates that does not know if any Solid Waste Management Units exist

10. If the response to question 9 is that Solid Waste Management Units exist, than check one of the following:

✓ Releases of hazardous waste or constituents have occurred or are thought to have occurred

_______ Releases of hazardous waste or constituents have not occurred

_______ Releases of hazardous waste or constituents have occurred or are thought to have occurred but have been adequately remedied

_______ It is not known whether a release of hazardous waste or constituents has occurred

11. The facility is on the National Priorities List or proposed update of the List or ERRIS list

________ Yes - indicate List or update

___✓___ No

________ Yes - ERRIS list

Prior to completion of the Recommendation portion of the Facility Management Plan, the attached Appendix must be completed.

12. Recommendation for Regional Approach to the Facility: Check one

__✓__ Further Investigation to Evaluate Facility

_____ Permit Compliance Schedule

_____ Corrective Action Order (may include compliance schedule)

_____ Other Administrative Enforcement

_____ Federal Judicial Enforcement

_____ Referral to CERCLA for Federally Financed or Enforcement Activity

_____ Voluntary/Negotiated Action

_____ State Action

Brief narrative in explanation of selection : ____________________

____

____

____

a) If further investigation alternative is selected:

_______ Site inspection - anticipated inspection date negotiable

State or Federal inspection negotiable

_______ Preliminary Assessment - anticipated completion date negotiable

_______ RI/FS - anticipated date of initiation negotiable

State/Federal__________

Private Party__________ identify party(ies)

____

b) If Permit Alternative is Selected: Projected Schedule

Date of Part B Submission: ______________

Date of Completeness Check: ______________

Date for Additional Submissions (if required): ______________

Date of Completion of Technical Review: ____________________

Completion of Draft Permit/Permit Denial: __________________

Public Notice for Permit Decision: __________________

Date of Hearing (if appropriate): ______________________

Date for Final Permit or Denial Issuance: _________________

Description of any corrective action provisions to be included in permit -

____

____

____

c) If Corrective Action Order Alternative is Selected:

Estimated Date for Order Issuance: __________________

Description of Provisions of the Order to be Completed by Facility: ______________________________________

____

____

Description of Compliance Schedule to be Contained in Order:

____

____

____

d) If Other Administrative Enforcement Action is Selected:

Projected Date for Issuance of the Order: _________________

Description of Provisions or Goals of the Order: __________________

____

____

e) If Judicial Enforcement Alternative Selected:

Date of Referral to Office of Regional Counsel: ____________

f) If Referral to CERCLA for Action Selected:

Date of Referral to CERCLA Sections: ________________

g) If Voluntary/Negotiated Action Alternative if Selected:

Date of Initial Contact with Facility: ________________

Description of Goals of Contact or Discussions with Facility: __________________________________

____

____

____

Date for Termination of Discussions if Not Successful:

____

Date of Finalization of Settlement if Negotiation Successful:

____

h) If State Action Alternative is Selected:

Date for Referral to State: ____________________

Name of State Contact: _________________________

Phone: _________________________

APPENDIX

The questions constituting this Appendix to the Facility Management Plan must be filled out prior to completion of recommendation elements of the Plan. The purpose of this appendix is to provide a summary documentation of the State and/or U.S.EPA review of available information on the subject facility. The intent is that a comprehensive file review will be conducted as the basis for selection of the recommended approach to a given facility. If the Appendix is completed by State personnel questions referring to available data reference information in State files; for Federal personnel the reference is to Federal files. Where questions refer to "all" available data or information and such material is voluminous, the response should indicate that files are voluminous, and then reference most telling information, for example groundwater contaminants found frequently or at extremely high concentrations should be specifically listed, and information most directly supporting recommended approach to facility should be described. If no information is available in facility files, the response should so indicate. It is also anticipated that this Appendix may be updated periodically as more information becomes available.

1. Description of All Available Monitoring Data for Facility:

Type of Data	Date	Author	Summary of Results or Conclusions
GW	1/15/86	EDI	indicator parameters data found in Part B app.

2. Description of Enforcement Status:

Type of Action	Date	Local, State or Federal	Result or Status
Consent Agreement + Final Order	1/31/85	Federal	Filed a Part A and implemented groundwater monitoring
" " "	8/5/83		

3. Description of Any Complaints from Public: no

Source of Complaint	Date	Recipient	Subject and Response

4. Description of All Inspection Reports for Facility:

Date of Inspection	Inspector (Local, State, Federal)	Conclusions or Comments
8/23/84	STATE/FEDERAL	
10/20/82	"	

5. During inspection of this facility did the inspector note any evidence of past disposal practices not currently regulated under RCRA such as piles of waste or rubbish, injection wells, ponds or surface impoundments that might contain waste or active or inactive landfills?

✓ Yes - give date if inspection and describe observation

sludge drying beds still require a determination

________ No

________ Don't know

6. Do inspection reports indicate observations of discolored soils or dead vegetation that might be caused by a spill, discharge or disposal of hazardous wastes or constituents?

_____ Yes - indicate date of report and describe observations

____

____

__✓__ No

_______ Don't know

7. Do inspection reports indicate the presence of any tanks at the facility which are located below grade and could possibly leak without being noticed by visual observation?

_____ Yes - date of inspection and describe information in report

____

____

____

__✓__ No

_______ Don't know

8. Does a groundwater monitoring system exist at the facility? __yes__

9. If answer to question 8 is yes, is the groundwater system capable of monitoring both regulated RCRA units and other Solid Waste Management Units? __no__

Explain - __may need a few more wells__

__i.e. sludge drying beds__

____

10. Is the groundwater monitoring system in compliance with applicable RCRA groundwater monitoring standards? __yes__

If no, explain deficiency __GW assessment under review__

__by EPA__

____

11. Decribe all information on facility subsurface geology or hydrogeology available.

Type of Information	Author	Date	Summary of Conclusions
HYDROGEOLOGIC INVESTIGATION	ERG.	11/4/83	

12. Did the facility submit a 103(c) notification pursuant to CERCLA?

_____ Yes Date of Notification ____________________

__✓__ No

13. If answer to 12 is yes, briefly summarize content of that notification. (waste management units identified, type of waste concerned)

14. Has a CERCLA Preliminary Assessment/Site Investigation (PA/SI) been completed for this facility?

_____ Yes

__✓__ No

15. If answer to question 14 is yes, briefly describe conclusions of the PA/SI focusing on types of environmental contamination found, wastes and sources of contamination.

____

____

____

____

____

16. If available, having reviewed the CERCLA notification, RCRA Part A and RCRA Part B, it appears that: (CERCLA unit refers to unit or area of concern in CERCLA response activity)

__________ RCRA and CERCLA units are same at this facility

__________ RCRA and CERCLA units are clearly different units

__________ There is an overlap between the RCRA and CERCLA units (some are the same, some are different)

17. Description of Any Past Releases or Environmental Contamination:

Type/Source of Release	Date	Material Released	Quantity	Response
3 abandoned acid pits 1400 yards each	1935-1969	K-062		

18. Identification of Reports or Documentation Concerning Each Release Described in Item 17.

Title/Type of Report	Date	Author	Recipients	Contents

19. Highlight any information gaps in the file - describe any plans to obtain additional needed information.

20. Summary of major environmental problems noted, desired solution and possible approaches.

Problem	Solution	Approach	Pros and Cons

STATE OF MICHIGAN

John Engler
~~JAMES J. BLANCHARD,~~ Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

RECEIVED
MAY - 1991
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V

May 7, 1991

Ms. Mardi Klevs
U.S. EPA, Region 5
230 South Dearborn
Chicago, Illinois 60604

Dear ~~Ms. Klevs~~: Mardi

SUBJECT: Preliminary Review/Visual Site Inspection (PR/VSI) Reports for RCRA Facility Assessment (RFA) at GMC, SPO, Swartz Creek, MID 003 906 773 and Quanex Corporation, MID 082 767 591

Michigan Department of Natural Resources, Waste Management Division (WMD) staff have briefly reviewed the two PR/VSI reports for RFA referenced above. Pursuant to direction received from Mr. Steve Buda, Chief, Hazardous Waste Permits Unit, Waste Management Division, I am forwarding the review comments directly to you.

GMC, SPO, Swartz Creek, MID 003 906 773

1. The purpose of the RFA is to identify all solid waste management units (SWMUs) and areas of concern (AOCs) at a facility regardless of their time of operation or release potential. The PR/VSI report for RFA (dated February 1991) prepared by Metcalf & Eddy, Inc. fails to do this.

   The PR/VSI report for RFA indicates that the on-site wastewater treatment plant was tentatively identified as a SWMU based on the file review. However, it was eliminated from the list of SWMUs since it was used to treat wastewater at the facility. Wastewater generated at such facilities typically contains many hazardous constituents. The components of the on-site wastewater treatment plant should be identified as SWMUs or the entire wastewater treatment plant identified as one SWMU in the report.

   The PR/VSI report for RFA also indicates that the trash compactor, tentatively identified as a SWMU, was eliminated because it is used to compact nonhazardous

RECYCLED PAPER

solid waste. The report did not specifically note the type of waste that the compactor handles making a determination regarding its status as a SWMU difficult to evaluate.

2. The PR/VSI report for RFA indicates that a closure certification for the three surface impoundments at the facility was submitted to the U.S. EPA for evaluation on June 20, 1986. It states that a decision regarding the closure certification is still pending. An update on any action that the U.S. EPA has taken on the certification since its submittal in 1986 would be appreciated.

3. Section 3.2, page 26, of the PR/VSI report for RFA references a hazardous waste tank area, a SWMU, operated under generator status. However, the same paragraph also suggests that the SWMU has been closed and the closure certification submitted on November 5, 1987. The WMD concurs that the subject tank is a SWMU. However, it is not clear why a closure certification was submitted for the closure of the tank if it has been operated under generator status.

Quanex Corporation (MID 082 767 591)

1. The PR/VSI report for RFA (dated February 1991) states in Section 2.3.1, page 13, that the "Releases of low levels of arsenic and 1,1 dichloroethane should continue."

   First, the source of the arsenic has not been proven, and may in fact represent background groundwater quality. The company has been requested in the 1991 Compliance Monitoring and Enforcement (CME) Report to submit a plan to confirm whether or not arsenic is naturally occurring in the groundwater.

   Second, the subject sentence would read better if it stated that "Releases of low levels of arsenic and 1,1 dichloroethane may continue until the sources are identified and remediated."

2. The PR/VSI report should identify the area around the wastewater treatment plant and monitor well MW-6 as an AOC due to the presence of 1,1 dichloroethane. The levels found in MW-6 are relatively higher than other wells, indicating another possible release, separate from the surface impoundments.

3. Releases of metals and organics from the surface impoundments area could also be from the buried landfill found at the southern end of the impoundments. The debris in the berms may be the source of any contaminants.

4. On page 26, paragraph D, of the report, it states groundwater monitoring has been performed, implying that such monitoring covered the former acid pits. No groundwater monitoring was designed to cover the old acid pits, and monitor wells were not shown to be downgradient of these units. Any statement regarding monitoring should be backed up by specific references to data.

This concludes our comments based on brief reviews of the referenced documents. Questions regarding comments on the report for GMC, SPO, Swartz Creek, should be directed to me. Questions regarding comments on the report for Quanex Corporation should be directed to Mr. Dave Slayton, Geotech Support Unit, Waste Management Division, at 517-373-8012.

Sincerely,

Ronda L. Hall

Ronda L. Hall
Environmental Engineer
Hazardous Waste Permits Section
Waste Management Division
517-373-9548

cc: Mr. Steve Buda, DNR
Mr. Dave Slayton, DNR
Corrective Action File

CERTIFICATION REGARDING POTENTIAL RELEASES FROM
SOLID WASTE MANAGEMENT UNITS

FACILITY NAME: Quanex - Michigan Seamless Tube Division

EPA I.D. NUMBER: MID 082 767 591

LOCATION CITY: South Lyon

STATE: Michigan

1. Are there any of the following solid waste management units (existing or closed) at your facility? NOTE - DO NOT INCLUDE HAZARDOUS WASTES UNITS CURRENTLY SHOWN IN YOUR PART B APPLICATION

	YES	NO
° Landfill	X	
° Surface Impoundment	X	
° Land Farm		X
° Waste Pile	X	
° Incinerator		X
° Storage Tank (Above Ground)	X	
° Storage Tank (Underground)		X
° Container Storage Area		X
° Injection Wells		X
° Wastewater Treatment Units		X
° Transfer Stations		X
° Waste Recycling Operations		X
° Waste Treatment, Detoxification		X
° Other ______		X

2. If there are "Yes" answers to any of the items in Number 1 above, please provide a description of the wastes that were stored, treated or disposed of in each unit. In particular, please focus on whether or not the wastes would be considered as hazardous wastes or hazardous constituents under RCRA. Also include any available data on quantities or volume of wastes disposed on and the dates of disposal. Please also provide a description of each unit and include capacity, dimensions, location at facility, provide a site plan if avaliable.

See drawing MD-000-A-072 and sheet 1.a

NOTE: Hazardous waste are those identified in 40 CFR 261. Hazardous constituents are those listed in Appendix VIII Of 40 CFR Part 261.

CERTIFICATION REGARDING POTENTIAL RELEASES FROM SOLID WASTE MANAGEMENT UNITS

2.

(a) Landfill (Abandoned)

- Volume - 200' x 200' x 3' = 4400 yds
- Trash, bricks, scrap steel, broken concrete, steel scale, and sand.
- Wastes would be considered non-hazardous under RCRA
- Dates active - Approx 1969 to 1977

(b) Waste Pile

- Volume - 50' x 3' x 3' = 50 yds
- Trash, bricks, scrap steel, broken concrete
- Wastes stored temporarily and would be considered non-hazardous under RCRA
- Wastes manifested for offsite disposal
- Dates active - Approx 1977 to 1985

(c) Surface Impoundment [70]

- Volume - 55,000 yds.
- Sludge from neutralized waste pickle liquor, delisted K-063
- Wastes would be considered non-hazardous under RCRA
- Dates active - Approx 1969 to 1985

(d) Surface Impoundment (3 abandoned acid pits)
(e)
(f)

- Volume - 80' x 80' x 6' = 1400 yds each
- Waste Pickle liquor sludge may have been treated with lime
- Wastes would be considered hazardous under RCRA, derived from K-062
- Dates active - Approx 1935 to 1969

(g) Tank - Waste Oil [60]

- Volume - 11,000 gal
- Waste Oil from manufacturing equipment
- Waste normally non-hazardous
- Stored for less than 90 days
- Sampled for heavy metals prior to disposal
- Dates active - Approx 1979 to 1985

3. For the units noted in Number 1 above and also those hazardous waste units in your Part B application, please describe for each unit any data available on any prior or current releases of hazardous wastes or constituents to the environment that may have occurred in the part or still be occurring.

Please provide the following information

a. Date of release
b. Type of waste released
c. Quantity or volume of waste released
d. Describe nature of release (i.e., spill, overflow, ruptured pipe or tank, etc.)

Groundwater data indicates we may be affecting ground water quality from regulated impoundments (63) and (64). Our current program and compliance monitoring will define any releases of hazardous waste releases if present. Sample borings in areas of abandoned acid pits and around regulated impoundments (63) and (64) not complete at this time.

4. In regard to the prior releases described in Number 3 above, please provide (for each unit) any analytical data that may be available which would describe the nature and extent of environmental contamination that exists as a result of such releases. Please focus on concentrations of hazardous wastes or constituents present in contaminated soil or groundwater.

Analytical Data is incomplete at this time. (First year summary of groundwater monitoring attached).

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the submittal is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. (42 U.S.C. 6902 et seq. and 40 CFR 270.11(d))

R. E. Russell, General Manager
Typed Name and Title

RER
Signature

11 - 11 - 85
Date

PARAMETERS ESTABLISHING GROUND-WATER QUALITY

PARAMETER	(UNIT)	WELL # 1 Upgradient X Downgradient ___ Q1	Q2	Q3	Q4	WELL # 2 Upgradient ___ Downgradient X Q1	Q2	Q3	Q4	COMMENTS
Chloride	(mg/l)	54	46	40	50	34	39	42	41	
Iron	(mg/l)	4.1	4.5	5.9	3.8	4.2	8.6	16	20	
Manganese	(mg/l)	0.65	0.82	0.74	0.66	1.0	1.6	1.9	1.3	
Phenols	(ug/l)	9	4	8	ND(4)	14	ND(4)	7	ND(4)	
Sodium	(mg/l)	44	47	41	40	45	50	43	4.7	
Sulfate	(mg/l)	760	870	1000	950	120	140	160	150	

PARAMETER	(UNIT)	WELL # 3 Upgradient ___ Downgradient X Q1	Q2	Q3	Q4	WELL # 4 Upgradient ___ Downgradient X Q1	Q2	Q3	Q4	COMMENTS
Chloride	(mg/l)	39	43	47	44	45	44	55	46	
Iron	(mg/l)	6.5	3.3	3.8	6.9	0.89	3.2	0.28	1.2	
Manganese	(mg/l)	0.57	0.58	0.58	0.58	1.8	1.8	2.3	1.8	
Phenols	(ug/l)	ND(4)	4	5	ND(4)	ND(4)	ND(4)	ND(4)	ND(4)	
Sodium	(mg/l)	62	56	61	5.0	54	58	55	5.4	
Sulfate	(mg/l)	220	280	300	320	1800	2200	2800	2800	

Q = Quarter

Q1 = December 22-23, 1984
Q2 = March 13-14, 1984
Q3 = June 20, 1984
Q3 = September 27, 1984

ND = not detectable at the detection limit enclosed by parantheses.

EPA Identifier MID-082 767 591

DRINKING WATER SUITABILITY PARAMETERS

		Upgradient X Downgradient ___ Well # 1				Upgradient ___ Downgradient X Well # 2				
PARAMETER	(UNIT)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	COMMENTS
Arsenic	(mg/l)	<0.001	<0.01	0.001	ND(0.001)	0.014	<0.01	0.021	0.016	
Barium	(mg/l)	0.19	<0.2	ND(2)	0.27	0.11	<0.2	ND(2)	0.14	
Cadmium	(mg/l)	ND(0.003)	ND(.003)	ND(.003)	ND(0.003)	ND(.003)	0.003	<0.003	<0.003	
Chromium	(mg/l)	ND(.005)	0.005	ND(.01)	ND(0.003)	0.005	0.013	ND(.01)	<0.001	
Fluoride	(mg/l)	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0.20	
Lead	(mg/l)	<0.01	0.01	0.02	<0.01	0.05	0.05	0.04	0.06	
Mercury	(mg/l)	ND(.0002)	ND(0.0002)	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N	(mg/l)	ND(.01)	ND(.01)	ND(0.01)	ND(0.01)	ND(.01)	0.03	ND(0.01)	0.37	
Selenium	(mg/l)	<0.01	<0.001	ND(0.01)	<0.01	<0.01	<0.001	ND(0.01)	0.017	
Silver	(mg/l)	ND(.003)	0.006	0.004	0.008	ND(.003)	0.005	ND(0.003)	<0.003	
Endrin	(ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Lindane	(ug/l)	ND(.1)	ND(.10)	ND(.10)	ND(0.10)	ND(.1)	ND(.10)	ND(0.10)	ND(0.10)	
Methoxychlor	(ug/l)	ND(.5)	ND(.50)	ND(.50)	ND(0.50)	ND(.5)	ND(.50)	ND(0.50)	ND(0.50)	
Toxaphene	(ug/l)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D	(ug/l)	ND(20)	ND(.50)	ND(.10	ND(0.10)	ND(20)	ND(.50)	ND(0.10)	ND(0.10)	
2,4,5-TP Silvex	(ug/l)	ND(.2)	ND(0.10)	ND(.05)	ND(0.10)	ND(.2)	ND(.10)	ND(0.05)	ND(0.10)	
Radium	(pCi/l)	ND (3)	< 3	<3	< 3	ND(3)	4	< 3	<3	
Gross Alpha	(pCi/l)	9	< 5	<5	5	ND(5)	8	< 5	ND(5)	
Gross Beta	(pCi/l)	ND(8)	< 8	<8	18	ND(8)	26	< 8	15	
Coliform Bacteria	(/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.

EPA Identifier: MID-082 767 591

DRINKING WATER SUITABILITY PARAMETERS

	Upgradient ___ Downgradient X Well # 3				Upgradient ___ Downgradient X Well # 4				
PARAMETER (UNIT)	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	COMMENTS
Arsenic (mg/l)	0.013	<0.01	0.007	0.006	ND(.001)	<0.01	0.001	0.001	
Barium (mg/l)	0.15	<0.2	ND(2)	0.23	0.22	<0.2	ND(2)	<0.2	
Cadmium (mg/l)	ND(.003)	ND(.003)	ND(0.003)	ND(0.003)	ND(.003)	<0.003	ND(.003)	ND(.003)	
Chromium (mg/l)	0.005	0.006	<0.01	<0.001	<0.005	0.010	ND(.01)	ND(0.005)	
Fluoride (mg/l)	0.3	0.3	0.3	0.4	0.1	0.2	0.20	0.2	
Lead (mg/l)	0.03	<0.01	<0.01	ND(0.01)	0.02	<0.01	<0.01	ND(.01)	
Mercury (mg/l)	ND(.0002)	<0.0002	<0.0002	<0.0002	ND(.0002)	<0.0002	<0.0002	<0.0002	
Nitrate, as N (mg/l)	0.44	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.01)	ND(0.1)	ND(0.01)	ND(0.01)	
Selenium (mg/l)	<0.01	<0.001	ND(0.01)	0.01	<0.01	<0.01	ND(0.01)	<0.01	
Silver (mg/l)	ND(.003)	0.005	<0.003	0.005	ND(.003)	0.013	0.004	0.012	
Endrin (ug/l)	ND(.1)	ND(0.1)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Lindane (ug/l)	ND(.1)	ND(0.10)	ND(0.1)	ND(0.1)	ND(.1)	ND(0.1)	ND(.10)	ND(0.10)	
Methoxychlor (ug/l)	ND(.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(.5)	ND(0.5)	ND(.50)	ND(0.50)	
Toxaphene (ug/l)	ND(1.0)	ND(1.0)	ND(0.1)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)	
2,4-D (ug/l)	ND(20)	ND(0.5)	ND(0.1)	ND(0.1)	ND(20)	ND(0.5)	ND(.10)	ND(0.10)	
2,4,5-TP Silvex (ug/l)	ND(0.2)	ND(0.1)	ND(.05)	ND(0.1)	ND(0.20)	ND(0.1)	ND(.05)	ND(0.10)	
Radium (pCi/l)	3	<3	<3	<3	ND(3)	8	<3	<3	
Gross Alpha (pCi/l)	8	6	<5	9	ND(5)	7	<5	ND(5)	
Gross Beta (pCi/l)	ND(8)	11	<8	16	ND(8)	19	<8	9	
Coliform Bacteria (/100ml)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	

*Exceeds EPA interim primary drinking water standards.

ND ( ) = not detectable at the detection limit enclosed by the parantheses.

< = parameter detected but at less than the detection limit.